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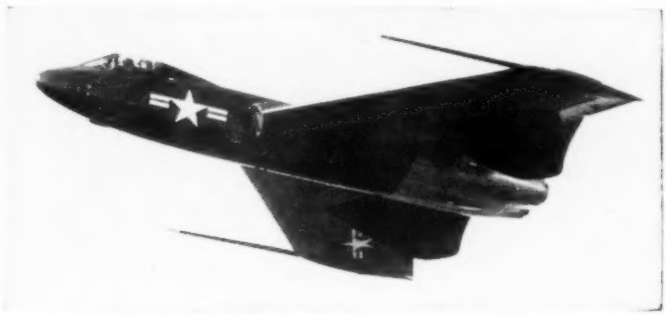
ONE OF THE truly new aircraft produced by the maestrom of post war aviation developments in aerodynamics and power plants is the tailless Vought XF7U-1, just announced. The radical new fighter has already completed its initial flight tests at the Naval Air Test Center, Patuxent, Md., and is scheduled for limited production in the new Chance Vought Aircraft factory near Dallas, Tex. The XF7U (named the *Cutlass*) consists of a nacelle containing the pilot in front and two Westinghouse 24C axial flow turbojet engines in the tail and a sweptback wing. Directional stability and control are obtained by use of a vertical fin halfway out on each wing panel at the trailing edge. Air inlets for the engines are located at the juncture of the wing leading edge and the fuselage.

Each engine is equipped with an "afterburner" assembly, which provides a powerful boost in thrust for fast takeoff or a speedy getaway in combat. The regular turbojet engine must take in a considerable excess of air (over that required for combustion) to cool the turbine. In addition, the turbine must not be allowed to exceed a certain temperature (800-1200 deg. F.) to prevent damage. This means that there is available a considerable quantity of air aft of the turbine, which can be used to burn new fuel. In addition, since the turbine has already been passed, no attention need be paid to the temperature of this second combustion process. The afterburner, then, injects fuel into the engine tailpipe and can provide an increase in thrust of as high as 50%. However, burning fuel in this way is very wasteful and the afterburner can only be used for short periods of time due to its extremely high fuel consumption.



Newest Navy jet fighter, Vought XF7U-1 *Cutlass*, is in 600 mph class and powered by two Westinghouse jets. This carrier fighter is designed for arrested landing, catapault launch and has tricycle gear

NAVY HAS awarded a contract for 19 of the new fighters, which it states is in the "over 600-mph" class. The main gear folds rearward into the bottom portion of the fins; the nose wheel, exceptionally long, folding rearward into the nacelle. The XF7U sits at a very high angle on the ground to provide the lift required for takeoff, the highspeed, low drag airfoil having very poor lifting characteristics at low speeds. The new fighter is unique in that it has no landing flaps! Yes, believe it or not, the XF7U depends on leading edge slats for low landing speed. The wing trailing edge is made up of "speed brakes" between the fins, and "ailevators" outboard of the fins, the latter units acting together up-and-down as elevators and independently as ailerons. The radical new craft incorporates hydraulic control boosters, ejection seat, carrier deck arresting hook and extensive use of magnesium in its structure.

AIR FORCE HAS FINALLY given up the bitter struggle and authorized Northrop Aircraft to complete the 10 remaining YB-35 Flying Wing bombers as YB-49 bombers powered by eight Allison J-35 engines. The original B-35 version with four P&W *Wasp Major* engines driving counter-revolving propellers through a remote drive shaft suffered endless mechanical difficulties that prevented the airplane from ever fully showing its performance capabilities. One solution tried was the substitution of single rotation propellers but even this did not end the remote-drive gear box troubles. A major consideration, however, was the astonishing performance of the jet version, which has a top speed of better than 500 mph and a cruising range of 4000 miles. Prototype YB-49 actually remained aloft 9½ hours in an endurance test, the longest a jet-powered aircraft has ever stayed in the air. 15 Flying Wing bombers will be built: three B-35 propeller models, two YB-49 jet versions, one of which was destroyed in a crash last spring, and the 10 converted bombers.

ONE MORE and possibly the last, of the "giant postwar" airliners we anticipated during the war has been fully certificated and is now entering service with several airlines. The Boeing *Stratocruiser* has been approved by the CAA for operation at a gross weight of 142,500 lbs., the greatest weight of any commercial airplane ever licensed in the U.S. The double-deck giant is powered by four Pratt & Whitney *Wasp Major* engines, which give it a cruising speed of 340 mph. Of the original "big 5," the Lockheed *Constellation* and Douglas DC-6 are now in airline service, the *Stratocruiser* is scheduled to enter service shortly and the Convair CV-37 and Republic *Rainbow* have been withdrawn from the race. Both have been completed as military prototypes (Convair XC-99 and Republic XF-12) but their great size and tremendous purchase cost forced Pan American Airways, their principal purchaser, to cancel the orders.

THE WRIGHT BROTHERS *Flyer*, first airplane to fly, has come home to roost—permanently. The historic biplane, which

(*Turn to page* 5)

MODEL AIRPLANE NEWS
JAY P. CLEVELAND
Publisher

Serving Aviation 20 Years

FEBRUARY 1949 VOL. XXXX—No. 2

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COVER—Sandra (Sandy) Hill, a member of the *Falcon Model Airplane Club* of Santa Barbara, Calif. and wife of club president Stan Hill, has been interested in model airplanes for 10 years. Active in contest flying for the past year, she has often placed in rubber, towline glider and free flight gas events. Mrs. Hill won consistently in local events with the *Jasco Special* she is holding in our cover photo.

HOWARD G. McENTEE....Editor
JOSEPH M. MANN....Managing Editor
WITTICH HOLLOWAY....Art Director
JAY P. CLEVELAND....Adv. Manager

Advertising Representative. WEST COAST: Justin Hannon, 5429 Crenshaw Blvd., Los Angeles 43, Calif.

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6V Booster 2.50 &	5.00
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Auto Charging Stand	1.95

IGNITION COILS

Aero Fotherweight	2.50
Walco	3.95
Aero Quality	1.00
Smith Competitor	3.95
Smith	2.50
Smith Firecracker	1.75
Super Coil	4.00
Unelectric	2.50
O.K.	3.95
Smith Dual	4.50
Aero Twin	4.00
O. K. Twin	5.00
Regular	1.50
Super Rated	2.00
Rogers	2.00

CONDENSERS

Regular	.20
Heavy Duty	.25
Aero Metal	.25
Champion Gp 29	.25
Rogers	.25
SPARE for GLO PLUGS	
Champion V-92, V3, V81, V83	.50
Sparkplug washers	.05
Arden Glo (#2 or #3)	.85
Ohlsson Glo (V or V2)	.85
Ohlsson Glo (V2, V3)	.85
McCoy Hot Point	.85
Complete set Sparkplugs	2.55

IGNITION ACCESSORIES

6 ft. Hook-up wire	.25
Alligator clips	.10
End Clips	.10
Tip Jacks (set) for boosters	.60
Arden Booster Jack	.25

Ample Booster Plug-in

Champion Gp 32	.50
Booster Switch slide .30 Twin	.50
Terminal Clips, 4 for	.25
Arden Battery Cord kit	.38

PROP SPINNERS

Fornacraft Swivel Tip	.75
U-Ikely Control	8.50
U-Ikely Handle	13.50
Jon Control Handle (pistol grip)	2.50
Steel Stunt Control Handle Bent	2.85
Thumb-it Control Handle	1.95
Control-it Elec. control unit	1.95
Speed Control Handle	2.95

WHEELS

Pelyerc Streamlined (pr) 1¾"	.45
2" .50, 2½"	.75
Aero Precision (pr) 2½"	2.15
3" .2.50, 4"	2.75
Aero Saver (pr) 2"-.75, 2½"-.90, 3"-1.00, 3½"	1.50
Sponge Rubber, Dural hub (pr) 7/8"-.25, 1"-1/8"-.30, 1-3/8"-1-7/8"-.55, 2-3/8"	.30
Sponge Rubber, Steel hub (pr) 2"-.60, 2½"-.50, 3"-	.80
Streamline Pneu. (pr) 1¼"-1½"-.50, 1¾"-2"-.60, 2½"	1.00
3"-.75, 3½"-.80, 4"-	1.75
Tail Wheel 7/8", 1", 1-1/8"	.25
Sparky Tail Wheel Assembly	.25

BATTERY BOXES

Metal, side by side, peanlite	.40
medium	.60
regular	.50
6 Pencell	.60
Plastic, end-to-end pen. med.	.75
Plastic, for 6 penlites	1.25
Wood	.75

FLIGHT TIMERS

Austin metal	1.25
Hillcrest plastic	1.25
Arden plastic	1.25
Stutter-set Valve	.75

MISCELLANEOUS

No. 90 Engine oil, 3 oz.	.25
pint	.60
Presto Disc Starter	.25
Cox Hi-Torque Starter	.50
"Spinit" Starter	5.00
Metal Prop Can	1.50
Tiger Fuel Pump	.75
Funnel Filter Fuel Can	.50
Fuel Line Filter	1.00
Motor Cover	.50
Flight Stop Watch	12.50
Widget Screw Driver	.10
Metal Motor Mounts, small	.80
large	.90
Neoprene Tubing, per foot	.30
Transparent	.25
Gasket Paper	.25
Tissue, 3-way	.25
4-way	.35
Universal Needle Valve flexible	.75
Needle Valve Extra, flexible	.10
Prop Saver	.10
Extension Shaft 4½"	2.00
Bolts & nuts, 8", 1" or 1½"	.10
Lock washers, lg or sm 12-	.10
D-E Fuel Shut-off Valve	1.00
Plastic Fuselage 10" set of 3	.50
Brass Tubing 1/16"-.12", 1/8"-.15	
Silkspun, light 10"x24"(white)	.05
8"x36"(white)	.05
Red, Blue, Yellow 24"x20"	.10
Nitrocellulose paper, 25"x30" white	.10
blue, green	.10
Silk per yard	1.50
Brushes	.10, .20
Cement (tubes)	.10 & .25
Model Hinges	.25
Landing Gear Wire /16-1/32", .06, 1/8", .06, 3/32", .10, 1/8"	.10
Landing Gear J-bolts, 4 for	.25
Landing Gear Straps 2.22" or 1/8", 12 for	.05
Celluloid 8" x 10"	.10
Washers, 3/8" 12 for	.05
1/2" 12 for	.10
Ball Bearing Washers 1/4, 3/8	.10
Plastics Bar	.10
Pilot Pill	.15
Wheel Collar & Hub, pr.	.25
Alum. Tubing, 1/16", 1/32", 1/8" (per ft.) 3/16", 1/4"	.20
Copper Tubing 1/8" OD, per ft.	.20
Brass Tubing 1/16"-.12", 1/8"-.15	
Sheet Aluminum (on ft) .010"	.25
.020"-.35, .032"-.50, .064"-1.25	
Sheet Brass (3"x12") 1/64"	.25
1/32"	.25
(12"x12") 1/64"	.40
1/32"	.40
Sheet Copper (12"x12") 1/64"	1.00
1/32"	2.00
Plywood (6"x12") 1/32"	.20
1/16"	.25
1/8"	.35
Masking Tape 1/4"x36 ft.	.15
3/4"x30 ft.	.29
Eyelets 1/16", 3/32" 12 for	.05
Pilot Pill	.15
Steel 1/16, 1/8, 3/16, 1/4 /ft.	.05
Bamboo, assorted pack	.25
Soldering Set	2.25

MUST EVERYTHING ELSE.

U-CONTROL ACCESSORIES

30 lb. Braided Nylon 35 ft.	.82
Stainless Steel Wire 100 ft.	.40
500 ft.	1.75
Stranded Speed Wire 25 ft.	.85
75 ft.	1.95
100 ft.	3.95
200 ft.	7.50
Fornacraft Swivel Tip	.75
U-Ikely Control	8.50
U-Ikely Handle	13.50
Jon Control Handle (pistol grip)	2.50
Steel Stunt Control Handle Bent	2.85
Thumb-it Control Handle	1.95
Control-it Elec. control unit	1.95
Speed Control Handle	2.95

CO2 PLANES, CARS & ACCESS

For Buzz CO2:	
Jumbo CO2 cartridge	2.00
Flywheel	.50
Props .25¢ set	.50
Streamer 24" (precut)	.60
Ercoupe 24" (precut)	1.00
Roberts Racer 20"	1.50
Cobra (prefab) 19"	.50
48-S 35"	2.00
Smart Speed Boat	2.50
For Compco 8-300:	
Props .20 &	.40
Jumbo CO2 Cartridge	2.00
Aeronca 21"	1.50
Aeronca Champ 18"(prefab)	.75
For OK CO2:	
Props .15, .25¢ &	.90
Spinner	.15
Flywheel	.50
Powerhouse CO2 25"	1.50
Stinson Voyager 30"	1.50
Topper II 13"	1.00
Porky 22"	1.50
Pepsi CO2 28" (prefab)	1.50
Quart Speed Boat	3.50
CO2 Cartridges ea. 10¢, 12 for	1.00
Gad-jet Racer incl. OK CO2	9.95

GAS MODEL BOATS

Sea Bird Hydroplane 24" B-C-D	6.95
Sea Bird Hardware	2.95
Miss P.T. 28"C-D	9.95
Bridal Hydroplane 26"-B-C-D	15.00
Dolphin 27" C-D	9.95
Commando 20" A-B	5.95
Miss Hydroplane 28"-C-D	9.95
O-Gee Runabout 29" C-D	10.95
O-Gee Hardware	4.95
Chris-Craft Cruiser 36"-C-D	9.95
Owens Yacht 26" C-D	4.95
Racer 25" B-C-D	4.95
Marine Drive unit for 3 above	2.75
Jones Hydroplane 27" C-D	22.50

BOAT ACCESSORIES

Couplings (1/8"-3/16"to 1/4")	1.25
Stuffing Box & Shaft (1/8" or 3/16")	1.50
Single Strote 1¼"-.75, 2½"-	1.00
3 Bladed Props 8" or 1"-.45; 1¼"-.50; 1½"- or 2"-	.60
2 Bladed Props 2½"-.50, 3"-	.60
Rudder Assembly	.85
Shafting 1/8, 1/8, 3/16, 1/4, 5/16, per ft.	.25

GAS BOOKS

Gas Modelers Guide	1.50
Gas Engine Handbook	1.00
Model Plane Construction	1.00
Control-Liners	1.00
Model Airplane Design	.75
Model Gas Engines	2.50
Model Aircraft Handbook	2.50
Gas Models & Engines	3.00
Model Motor Manual	3.00
per Age: 21 Models	3.00

RACE CARS

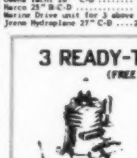
McCoy Invader, not Bat or Streamliner	42.50
Bowling	45.00
Rocket	24.95
(Also complete accessories)	

THIMBLEDROME & ACCESSORIES

Thimbledrome Race Car	3.95
Champion ready-to-run, including Engine	9.95
Accessory Drive Unit	1.95
Lanzen & Smith Drive Unit	8.00
Micro Conversion Kit	2.50
Micro Conversion unit	1.95
Arden Conversion Unit	4.95
Mary's Conversion Unit	2.00
Con Drive Unit	3.95
Con Arden Gear	1.95
Con Drive Shaft	1.95
Frame T.D. tank	.95
Frame Runner, tires (pr.)	.75
Free running 2"-1.20, 3"-	1.35
4"-	1.50
Drive Tube 24"	1.95
Cox Fuel Check & Lube	.75

ALSO ALL COX UNITS

3 READY-TO-RUN LEADERS!
(FREE PREMIUMS INCLUDED)



THOR B $9.95

Everything you want in your engine. A REAL POWER PLANT! .29 displ., 1/6 h.p., wt. 4¼ ozs. Class B

GENIE 29 $6.95

Boys! Here is the engine you've always wanted. An engine that's been acclaimed the easiest starting gas engine.

RAM $6.75

With features that step-up delivered power, give longer life with light weight. Class B. .292 displ., 1 6th h.p., 6800 rpm, weight 4¼ ozs.

DUAL RAM (including glo-plug) **$6.95**

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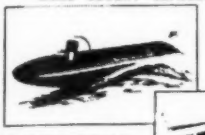
America's Hobby Center is the country's LARGEST motor and gas model headquarters "where your interests come first"

COMPLETE SPEED BOAT OUTFIT

Here is a real buy for racing-boat enthusiasts. You get a complete outfit: The new Scientific "Buckeye" torpedo-type speedboat which is completely prefabricated with a ready-carved hull and top deck; 17" long, 5" beam. Can easily be built in one evening . . . AND a fine motor . . . AND all accessories—everything you need to build and operate the boat. Actually clocked at 40 m.p.h. in test runs!

THE COMPLETE OUTFIT AT ABOUT ONE-HALF THE ACTUAL COST IF THE ITEMS WERE BOUGHT SEPARATELY!!



takes one evening to construct

the NEW "BUCKEYE" Speedboat with choice of:

GENIE OR JUDCO Engines, $11.95

with choice of:

THOR OR OHLSSON Engines, $14.95

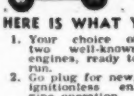
HERE IS WHAT YOU GET:

1. Your choice of four well-known engines.
2. Fuel tank
3. Champion spark plug.
4. Complete engine instructions
5. Wilco Quality coil.
6. High tension wire.
7. 18" insulated ignition wire.
8. Everlast condenser.
9. Metal battery box.
10. 4 mounting bolts.
11. 4 mounting nuts.
12. Coil holder.
13. Wiring lugs.
14. Motor cover.
15. Plug gauge set.
16. No. 70 motor oil.
17. 50 page book: Gas Engine Theory.
18. 3-way spark plug wrench.
19. Ignition slide switch.
20. "Buckeye" speed boat kit.
21. Full size simplified boat plans.
22. Sandpaper.
23. Brass stuffing box.
24. Prop shaft (boat)
25. Universal coupling.
26. Engine flywheel.
27. Wakazo & hardware.
28. Di. cast 2 bladed prop.
29. Bridle mount.
30. Adjustable engine mounts.
31. Casein waterproof glue.
32. Black & Gold decals.
33. Numerals.
34. Complete instructions.
35. Membership in the Modelcrafters of America.
36. Postage.
37. Insurance.
38. Packing.
39. Full A. H. C. Guaranty.
40. 24 page Giant Hobby Catalog.

COMPLETE RACE CAR OUTFIT

Everyone is racing the new Thimbledrome race car, the little 10" model that cannot be beaten for realism, craftmanship, speed and lasting pleasure. Speeds from 15 to 70 miles per hour. You can race this car in a schoolyard or any small, level space.

COMPLETE OUTFIT AT ABOUT ½ THE ACTUAL COST IF ITEMS WERE PURCHASED SEPARATELY!!



with BUZZ $10.50

with OHLSSON $15.50 (both glo engines)

HERE IS WHAT YOU GET:

1. Your choice of two well-known engines, ready to run.
2. Glo plug for new, ignitionless engine operation.
3. Metal fuel tank.
4. Neoprene gas line.
5. Complete engine instructions.
6. Battery connecting wire.
7. Mounting bolts.
8. Mounting nuts.
9. Motor cover.
10. Pamphlet on glo fuels.
11. Plug wrench.
12. Thimbledrome race car complete includes rubber race-car tires.
13. Complete instructions for installing and running engine.
14. Motor mounting bracket.
15. Flywheel.
16. Yoke.
17. Tether cord.
18. Membership in Modelcrafters of America.
19. Postage.
20. Packing.
21. Insurance.
22. Full A. H. C. Guaranty.
23. 24 page Giant Catalog.

Everything you will need except a 1½ volt battery, fuel and a small file for cutting away parts of the body to install the engine. In addition, mounting and motor shaft holes must be drilled.

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SPECIAL! BARGAIN!

COMPLETE FLYING OUTFITS

CHOICE OF U-CONTROL OR FREE FLIGHT

$10.00 CHOICE OF

JUDCO † GENIE † RAM †

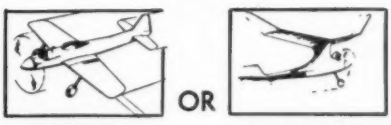
$12.50 CHOICE OF

McCOY 19 GLO THOR OHLSSON † 19 or 23

PLUS

$13.50 CHOICE OF

McCOY 19 Ball bearing & rotary valve OHLSSON 19 or 23 Rotary valve



U-CONTROL SKYSTREAK AIRPLANE OR FREE-FLIGHT BANSHEE

$15.00 CHOICE OF

ARDEN † .099 PHANTOM †

PLUS

OVER 75 ITEMS WORTH TWICE OUR COMBINATION PRICE!

HERE ARE YOUR PRINCIPAL ITEMS:

● Your own choice of 19 well-known, factory assembled engines, all guaranteed by the manufacturer and America's Hobby Center. ● Your own choice of either a U-Control SKYSTREAK plane (preserved fuselage, wings - easy to build and fly) or a 50" Free-Flight BANSHEE plane. ● PLUS: Wilco Quality Coil ● Everlast Condenser ● 12" High Tension Lead ● 18" Insulated Ignition Wire ● : 100 ft. U-Control Wire & Reel ● Rubber Wheels ● Formed Landing Gear ● Correct Size Propeller ● Large Tube Cement ● : Control Handle ● Ignition Slide Switch ● Metal Battery Box ● 3-way Sparks Plug Wrench ● Champion Spark Plug & Gasket ● : Ballcrank & Pushrod ● 4 Mounting Bolts ● Wiring Lugs ● Speed Indicator ● Presto Engine Starter ● Plug Gauge Set ● Motor Cover ● 50 pg. Book: Gas Engine Theory ● 150 pg Control Liner or Construction Book ● Insignia ● Flight Log ● Complete Engine Instructions ● Complete Plans for Building Plane ● "Pro" All-Metal Knife ● No. 70 Oil ● Coil Holder ● : Bubble Canopy ● Sandpaper ● Membership in Modelcrafters of America ● 4 Mounting Nuts ● Engine Adjustment Chart ● Plane Identification Tags ● Postage ● Packing ● Insurance ● 24 pg. Giant 2-color Catalog.

(†) Included in U-Control only!

* State whether Glo-Plug or ignition engine is wanted. Ignition parts not needed with Glo-Plug engines are omitted where Glo-Plug engine is ordered.

It isn't often that you get the chance to buy, at less than half price, your choice of either a U-Control or a Free-Flight Outfit with your own choice of 19 well-known factory-assembled ignition or glo engines. Everything carries the famous America's Hobby Center guarantee.

Even if you are a beginner, you won't have trouble building and flying any of these flying outfits. Full-size plans of easy-to-build planes, every accessory you will need, complete instructions, etc., etc. If you are an old-timer at building and flying model planes we don't have to tell you what this bargain outfit is really worth.

Thousands of these complete units have already been sold. They have met with enthusiastic reception because they represent a value unheard of before in the modeling field. The price is so low that we cannot sell to dealers. You really save from $10 to $12 by buying the complete, packaged unit - everything is engineered by experts for a perfect flying combination.

YOU WON'T GET ANOTHER BARGAIN LIKE THIS SOON!

HERE IS WHAT YOU GET:

1. CO2 Engine, ready to run.
2. CO2 Capsule holder.
3. 2 CO2 Capsules.
4. Correct propeller.
5. Complete engine instructions.
6. Complete suitable airplane.
7. Landing gear.
8. Wheels.
9. Complete plane plans.
10. Cement (if needed).
11. Flight log.
12. Insignia.
13. Identification tags.
14. Packing.
15. Postage.
16. Insurance.
17. Membership in Modelcrafters of America.
18. 24 pg. Giant model catalog.
19. Full A.H.C. Guarantee.

NOTHING ELSE TO BUY!!

COMPLETE CO2 FLYING OUTFITS

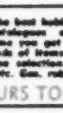
$5.95

BUZZ CO2 ENGINE (includes refillable tank, capsule charging unit). Costs only 2c per flight to run. Choice of Cavacraft Stinson or Ercoupe kits with all parts Cava-Cut (kits are completely prefabricated, ready to assemble).

$6.95

O.K. CO2 ENGINE (largest CO2 engine made) with choice of Megow CO2 Special (completely ready to fly—no gluing) or the contest CO2 Powerhouse kit.

$10.95



CAMPUS A-100 (CO2) ENGINE (smallest CO2 engine made, includes refillable tank). Costs only 1c per flight to run. Choice of Cavacraft Aeronca kit with Cava-Cut parts, completely prefabricated, ready to assemble or Carter Craft SE-5 kit.

For the younger set, their Fathers and big brothers, there's nothing like the thrill of CO2 flying. You don't need much space for free-flights (100 feet square on windless days), and less than a twenty foot circle for tethered flying.

There's nothing to learn and plenty of fun!

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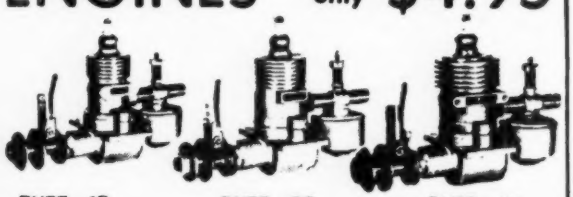
EXTRA! EXTRA! ENGINE PRICES DROP!

Class A, B or C ENGINES now only $4.95



BUZZ 19 CL"A" $4.95 — BUZZ 29 CL"B" $4.95 — BUZZ 35 CL"C" $4.95

BIGGEST NEWS IN YEARS!!

We are the largest model motor headquarters in the world. We have sold over 200,000 model engines (made by 117 different manufacturers) in the last 15 years. We *know* engines. When we were approached by one of America's largest companies in this field and offered the exclusive agency for the sale of the BUZZ, we knew we had the biggest bargain ever offered to the American Modeler.

WHO MAKES THESE ENGINES?

The BUZZ Engines are manufactured by a company that for years has been the world's largest maker of automobile replacement pistons and other precision gasoline engine parts. Thousands of gas engines and parts were made during the war by this company for the War Dept. for use in walkie-talkies, field generating sets, etc., etc. Since the war, thousands of gas engines have been made for scooter, lawn mower and other industrial uses. When we say unconditionally that the BUZZ engine is well engineered and well constructed, will give you plenty of good service, this is no idle boast, but a fact!

NOT A CLEARANCE SALE!

As the owner of a BUZZ Engine, you are sure that you will always have available full service for your engine, as well as replacement parts. You will never have an "orphan" engine on your hands. We guarantee service and parts for your engine for at least five years.

PRECISION ENGINEERED!

Despite its low price, the BUZZ Engines have been engineered to the last decimal point. Pistons and cylinders have been carefully burnished by a special patented process within .0002 of an inch. All bearing surfaces are made of selected materials and finished with the most costly care and equipment. Even a Champion Spark Plug is included. Every BUZZ Engine is indeed a jewel of precision engineering.

Do not judge the BUZZ Engines by their low prices. It is true we make very little money on each engine sold. But because many, many thousands of these engines have been produced by the latest modern processes, the cost has been reduced so that they can sell at the lowest prices ever seen.

THE BEST BUY IN ENGINES EVER

YOUR CHOICE OF BUZZ A, B or C $4.95 EACH

SERVICE & PARTS SUPPLY Guaranteed FOR 5 YEARS!

1949 MODEL ENGINES AT LOWEST PRICES EVER!

PRECISION ENGINEERING OFFERS:

- Construction and materials that permit use of engines in boats and cars as well as airplanes.
- Complete instructions.
- Streamlined for cooler operation and longer life.
- Easier to start.
- Steady, consistent running.
- Lightest weight engines ever made in relation to power produced.
- All wearing surfaces especially finished for longer wear.
- Requires shorter break-in period than any other engine.
- All metal tank that takes any fuel.
- Invertible and runs in either direction.
- Replacement parts available and interchangeable.
- Runs on easy-to-get oil mixed with ordinary gasoline. No hard-to-get and dangerous chemicals needed.
- Smooth, velvety power that never lets you down.
- Last but not least, we maintain an inspection and testing department where your engine gets the last word in care not only before it is shipped, but where it can receive expert attention if anything goes wrong after you own it.

NOW YOU CAN AFFORD THE BEST!

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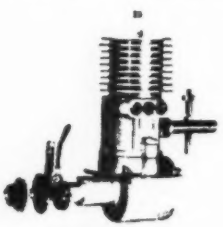
SPECIFICATIONS	19	29	35	60
Displacement	.199	.299	.350	.610
Bore	.625	.812	.880	1.0
Stroke	.562	.562	.562	.777
Horsepower	1/7	1/6	1/5	1/4
RPM	7,500	8,000	8,500	9,000
Propeller	8"	10"	11"	12"
Weight (oz)	4	4¼	4¼	9

Class D BUZZ now only $7.95



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Complete with Spark Plug
Ideal for Glo-Plug Operation

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With each and every engine is included a full 30-day written guarantee against defective parts and workmanship. You take no chances with BUZZ Engines. In addition, service and replacement parts are guaranteed for at least five years.

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Modelers have long wanted a CO^2 engine they could fly indoors *or* outdoors. It's here, *now*—the Buzz CO^2 engine with the refillable tank. Not one, but *five* flights per Standard capsule! Only 2c per flight instead of 10c or if you use the giant CO^2 capsule, your flights cost you only 1/3 of a cent each!

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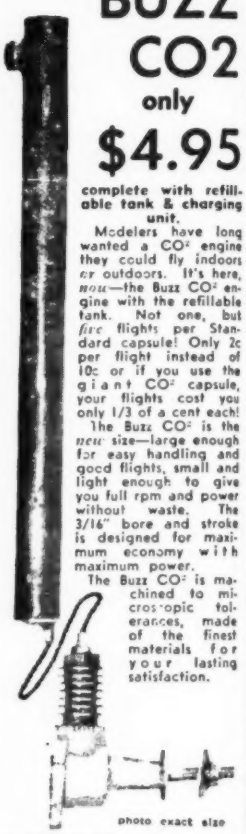
The Buzz CO^2 is machined to microscopic tolerances, made of the finest materials for your lasting satisfaction.



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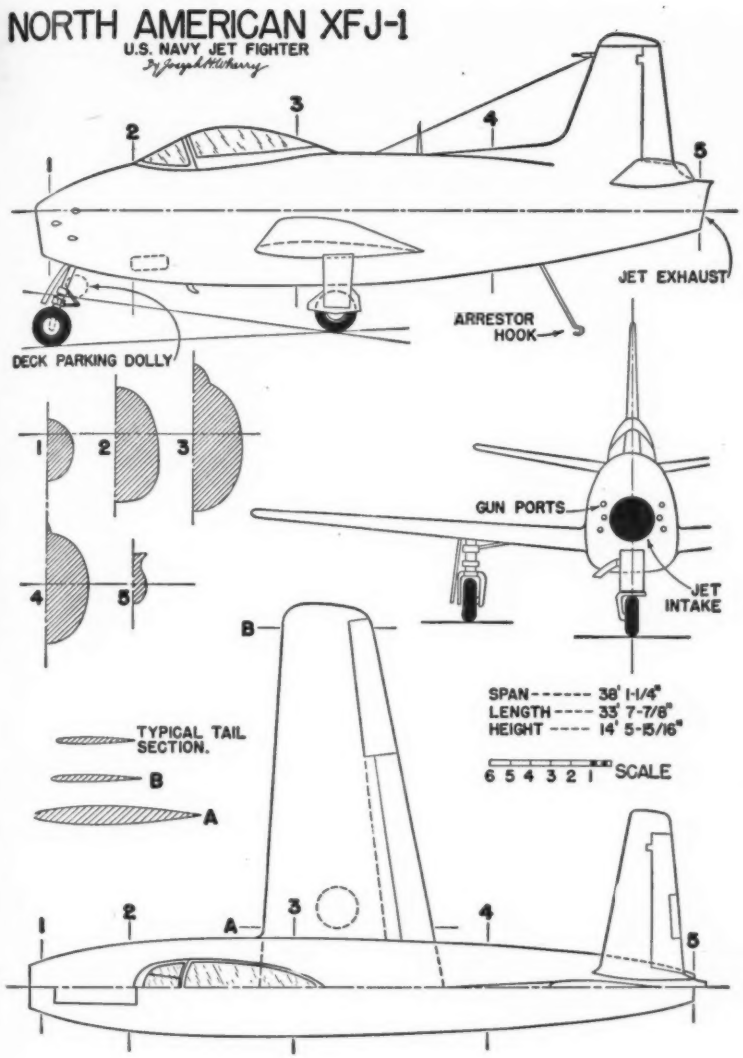

(*Continued from page* 1)

carried the brothers aloft on that historic Dec. 17, 1903, now hangs in the main entrance of the Smithsonian Institution in Washington, D.C. after a 20 year sojourn in London. Orville Wright sent the fragile craft abroad in rebuke of the Smithsonian, which had originally sponsored Prof. S. P. Langley's experiments and claimed that although Langley's *Aerodrome* did not actually fly it was the first airplane "capable of flight" since it flew successfully in 1914 after rebuilding by Glen Curtiss. However, Orville Wright soon learned that this "rebuilding" consisted of very extensive redesign and entirely new construction. However, amends were later made—the Smithsonian apologized for its error and Orville Wright's will directed return of the precious biplane to the land of its birth, to which it gave the heritage of flight.

AIR FORCE has ordered the ugliest flying machine in the world into production! Yes, the Kellett XR-10 twin engine helicopter has been approved and a contract for the production of 10 of the craft awarded, yet no one is certain yet who is going to build it! Kellett went bankrupt more than a year ago and its various projects and equipment have since been divided up among a number of groups. The XR-10 has proved such a good aircraft that AF wants 10 of them, yet there is no Kellett company to build them! For all its lack of beauty, the XR-10 is an outstanding helicopter with an ability to lift a gross weight of 15,500 lb., to climb to 12,000 ft. and to hover-climb to 4,000 ft. (no forward motion). The dual-rotating rotors intermesh in an "egg beater" arrangement to obviate the necessity for a tail rotor to counteract the torque. It is powered by two aircooled Continental engines of 525 hp each, making it the most powerful helicopter in the world.

ANOTHER ONE OF THOSE postwar "Gosh—what next?" developments—rainmaking—has been called off by AF following more than a year of glowing reports. While there is unquestioned proof that "sowing" dry ice in moisture-laden clouds under critical conditions of humidity and temperature can produce rain, the AF has come to the conclusion that the process does not have wide enough application or enough dependability to warrant its further development as a military weapon. This, of course, has nothing to do with its future as a commercial effort, particularly in the farm field, but AF just can't see it as a tool of war.

GREAT BRITAIN has at last decided to take the plunge into the jet bomber field. Armstrong Whitworth is now at work on a full scale version of their well known tailless A.W. 52 research airplane. The full scale bomber will feature a similar tailless design but will be powered by 8 jet engines of yet unannounced type. This will place the new A.W. bomber in the same class as

(*Turn to page* 56)

COMET

Smashing Out one **HIT** *after* **ANOTHER!**

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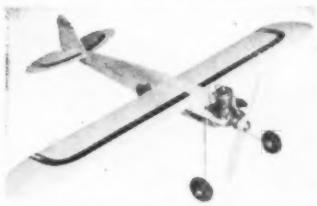
CONTROL MODEL



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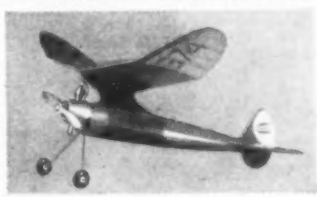

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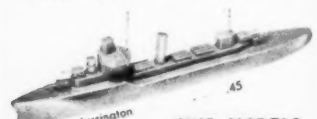
Mikado Locomotive and Tender (Shown at top)	1.00
Rock Island Rocket	1.59



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REPORT FROM THE WEST

by "Tip" Hannon

RECENTLY I had a fine evening talk session with some of our active modelers. A number of them were in the game almost before the Wright brothers, but the majority of them were more recently bitten by the bug. Outside of settling world affairs in general, the chatter narrowed itself down to the supposed battle that is going on between the older diehard free flighters and the so called speed hounds. "Free flight is not dead!" . . . "Speed is about as much fun to watch as elephants doing a waltz!" . . . "You need another airplane to go out to get the one you launched." . . . "Give me a tow-line glider!" . . . etc. . . We heard all kinds of remarks, some of them, as you can see from the above, were not very complimentary.

MODEL AIRPLANE NEWS (which this year is celebrating its 20th anniversary as the only model airplane magazine continuously published for 20 years under the same name) has grown up with this hobby and sport and has seen it develop from the rubber-band days to the beautifully designed and engineered motors of today. During that period modelers began to divide into factions, and one faction would get into an argument with another group—but these differences of opinion have only made the sport that much healthier. And will continue to help it grow. One club that favors free flight is going all-out to beat the club that goes for radio control or a club that specializes in speed.

We can all get along, and we are going to get along for the good of the entire sport. That's what was essentially brought out at the end of our bull session. One of the avid free flight men was asking a speed fellow some questions on the inner workings of the man "at the end of the piano wires". And their conversation was the start of a general discussion between these two groups about the fun that each received from their particular branch of model flying.

As long as there are people they are going to like different things. You may like a certain type of motor, while the next fellow won't even be seen going to a meet with one. Both have their merits nevertheless. It's the same with the different types of modeling. Let's give a helping hand to the fellow who likes to make the thing move as fast as it can. Let's also give the fellow who likes to go for distance the same sort of consideration.

Model airplanes in some parts of the country have been sent to storage for the winter; but out here the only thing that stops flying is that never-mentioned condition of rain. The West Coast has always been a leader and we can take up the reins now and pull toward a more cohesive group of modelers.

• •

A couple of Sundays following the aforementioned bull session we met again. Not a planned meeting, mind you, but come a Sunday morning and you can see most of the fellows around Western and Rosecrans. I went there with the intention of looking over a radio controlled job. Saw some beauties, too. Took a friend who was just as thrilled as I was, and he got interested in model airplanes right away.

(Next time you plan to go out to a meet, take a newcomer with you. If you get a new fellow interested it helps make ours a bigger hobby. It means bigger and better meets. And it means new blood so vital to making model airplanes the top hobby. Maybe you've noticed these new faces. Have you stopped to think that these new fellows aren't all young. Next time you go out flying, take a close look and you'll be surprised to see just how many of the fliers have sons and daughters. Of course we want the 10 and 12 year olds—but I think you'll agree that a few older fellows are welcome additions to the various meets held in these parts.)

But going back to that fellow I took out with me—one of the first things he asked about was the clubs. I named a half dozen and directed him to the secretary of the nearest one. Sure, anyone is interested in something new the first time he sees it, but this fellow, unlike a lot of people that "take up" a hobby, made it a point to contact the club secretary that evening and he joined up. The best part of the story is yet to come. He sent three months dues in ahead of time! What club wouldn't welcome a member like that.

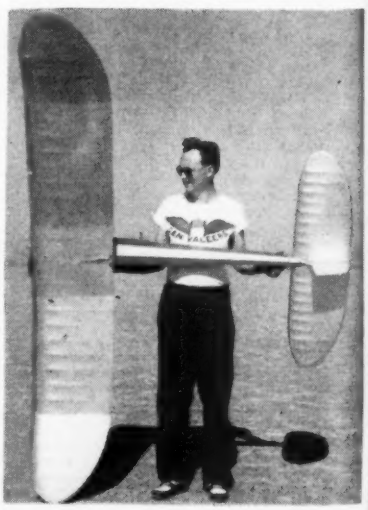
Former Chicago *Aeronut* Jim Tangney, now an Ensign in the Navy, flies with West Coast boys when his ship is in port

So bring a new fellow out with you the next time you go to a meet or for a flying session.

• •

This story has been kicking around for some time now but it's still good. Seems Jim Walker, known to practically everyone in the model airplane world, was demonstrating a new trick. His latest is a carrier takeoff using the U-Reely control. The way he does it now, however, the prop spins horizontally with the fuselage vertical; gives you the impression that a helicopter is buzzing in and out the length of the wire. Looked rather out of the ordinary to some bystanders to see this plane moving out the length of the wire, its prop still pointed skyward. Two pint-sized spectators remarked after he brought it back in one piece: "Kind of tail heavy there, isn't it, mister?"

Ace Boultinghouse of Alhambra set AMA record for Class D with this 5½ lb. giant powered by Anderson *Spitfire*. Wing area is 1400 sq. in. and total time was 21:59.8



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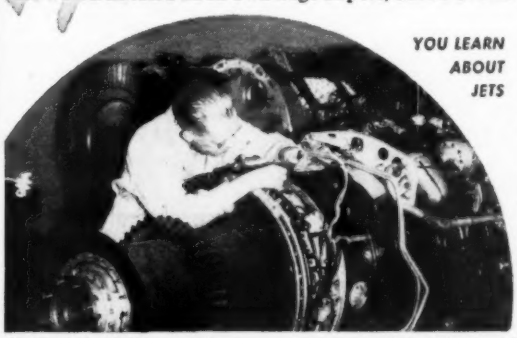

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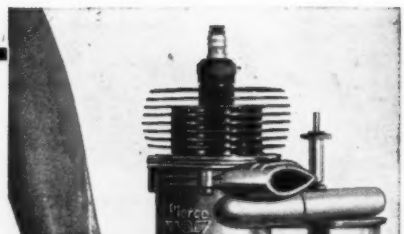

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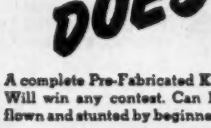

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SCRAP BOX

By BILL WINTER

THE year 1949 could be one of many changes. It certainly will be one of many opportunities. What we do with these opportunities largely will decide whether new types of models, of engines, of flying itself, will simply be relegated to the status of additional contest events . . . or whether these revolutionary developments will be appreciated and developed to their maximum potential. The one course would make a fad of new activities we surely will see this next year; the other could be a shot in the arm for the hobby in general, and for both U-control and free flight in particular.

Yes, this could be a great year. The ills and deficiencies of both speed and free flight as we now know them are so marked that something is certain to be done about them. Without prejudice to either basic form of flying we have repeatedly put down in earlier columns the beliefs and opinions of experts in the field which, boiled down, said that U-control, in getting too fast, was becoming dangerous and exclusive; and that free flight in its way also had become much too potent. Now, for the first time in years, possibilities exist to do something about these much discussed but little acted-upon problems.

The semi-scale model offers an out from the present blind alley in speed. No one is against speed as such. It must be recognized by less understanding proponents of other kinds of flying, like the free flight faithful or the rubber-job specialists, that speed has contributed plenty. However, the great majority of speed fliers know from what they see at contests throughout the nation that, if speed is to hold its place, it must correct certain evils. It must become safer for the spectator and modelers on the outside of the circle, less of a show-down between combinations of engines-prop-fuel which no longer prove anything, and more of a common meeting ground for a greater group of modelers.

That this is a mighty tough problem must be admitted. The basic question is how the speed model can be slowed down without spoiling the fun for the guys with racing in their blood. By far the best suggestion so far is the semi-scale job which, because of such limitations as a ceiling on displacement, fully cowled engines, and fixed landing gear, promises to bring speeds down to safe figures while maintaining (if not actually increasing) the thrill of competition. Oh, the semi-scale ship someday will pose problems of its own but in the swap we should get headaches that are far less severe than our present brain busters. By now you have heard so much about the semi-scale proposition that it is hardly necessary to weary you with more details.

Of at least equal importance in the free flight field is the new, small—and we do mean small—engines, like the K and B *Infant* with a displacement of but .020. As this is written, rumor has it that at least three manufacturers are working on engines competitive to the K & B. Undoubtedly we soon will be hearing of special events for the small displacement mills, and it is to be expected that free flight meets will be scheduling new events. (What class will it be—minus A?) If we let it go at this we should have our noggins examined by an expert bump analyzer. In conjunction with some more sensible and interest-

ing form of competition besides that of duration, the little engine could be the salvation of the free flight game. Let your mind run on this and you'll see how that could be.

Both the semi-scale speed racer and the small-fry free flight can do much for the hobby for the fortunate reason that they tie in with the best interests of modelers at large. As the ads suggest, the average fellow is interested primarily in sport and scale in control-line and if we want him to compete it will have to be on a basis that has some attraction for him. While the little engine will be seen in control jobs, it will permit for the first time the flying of sport type free flight airplanes in relatively restricted areas. This is what the average Joe wants. He'll be tempted by our contests if free flight jobs and events make more sense than at present.

Hanging on the wall as we write is a newly finished cabin sport model for the *Infant*. Contest fiends would look down their noses at this model. It slightly resembles an airplane and has a wing area that would suit it for competition with an *Arden .099*. But it will fly passingly well and should give us plenty of fun. It is the first free flight job to come off our bench in 20 months! (What have we been building? Rubber, of course!) Close on its heels is an *Ohlsson 23* sport model with cowled engine, open cockpit, windshield and headrest, parasol wing and wheel pants. To slow it down to where it flies like an airplane, it has a 5 foot wing and is made of the heaviest materials. The prop is 2 inches oversize. We even tried a pre-war *Bantam* with a 14 inch diameter prop on *O & R* glow-juice, and the combination has more pep than we need. No we are not trying to sell this particular deal for general flying, but we mention it to show how far it is possible to go in rationalizing free flight.

* *

So much has been said about bad merchandise of the war years that it is high time we give credit to some of the splendid items that dealers now have in stock. If you have an old kit, or just an old plan, around from a few years back compare it sometime with one of the new control kits! There is nothing like a good product to encourage the beginner to keep at the hobby. On a recent weekend we made our regular pilgrimage to the hobby shop (it's 40 miles away), accompanied by our oldest male offspring. We won't say how old he is, for obvious reasons, except that he has yet to finish a flying model. He's a fuselage expert, if you know what we mean. Well, he asked for a *Strombecker* solid, a *Swift*.

Strombecker, as you know, does a marvelous business in those hardwood ready-carved trains and planes, etc. Now we know why. This *Swift* fitted together like a charm. With a little advice on filling, filleting and painting, our potential balsa butcher turned out a neat little job that would do anyone credit.

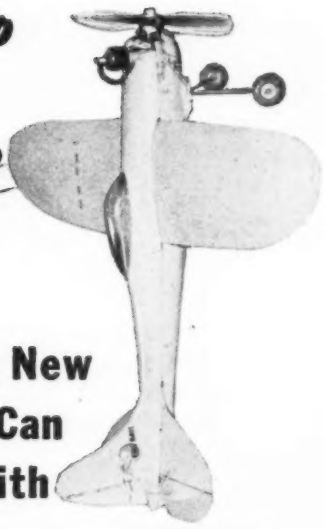
What with pretty decals for windows, trim, wheel hubs, license numbers, and accurately carved parts, he could hardly miss. Now the point of all this is not to plug *Strombecker*—though they deserve the compliment—but to show what happens when a kid has success with a kit. With the *Swift* under his belt, this one dug up a hand launched glider plan and came up with a good job, fairly well finished, and soon was tossing it higher than the house. It flew so well that he swiped his old man's *Tester Trainer* kit and put that together. The darn thing came out so well that his dad is going to try and fly it shortly. To top it off, two younger chips off the old block took to whittling hand launched gliders. Well, there we were, wondering how to make model builders out of this bunch when along comes *Strombecker* with a Temco *Swift* solid model. Now we can't get any rest. "Can I have another razor blade, Daddy?" Coises on you, Strombecker!

* *

Vernon Gray, well known in prewar for his Moffet Models, gives the lowdown on the rebirth of New Zealand modeling after

(*Turn to page 44*)

Have You Tried to Fly the SABRE DANCE?



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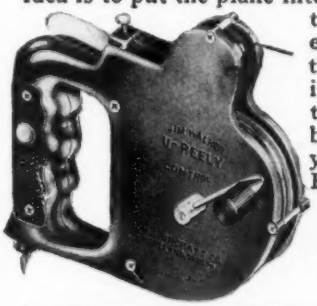

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Stroboscope sequence shows vertical approach balloon bursting

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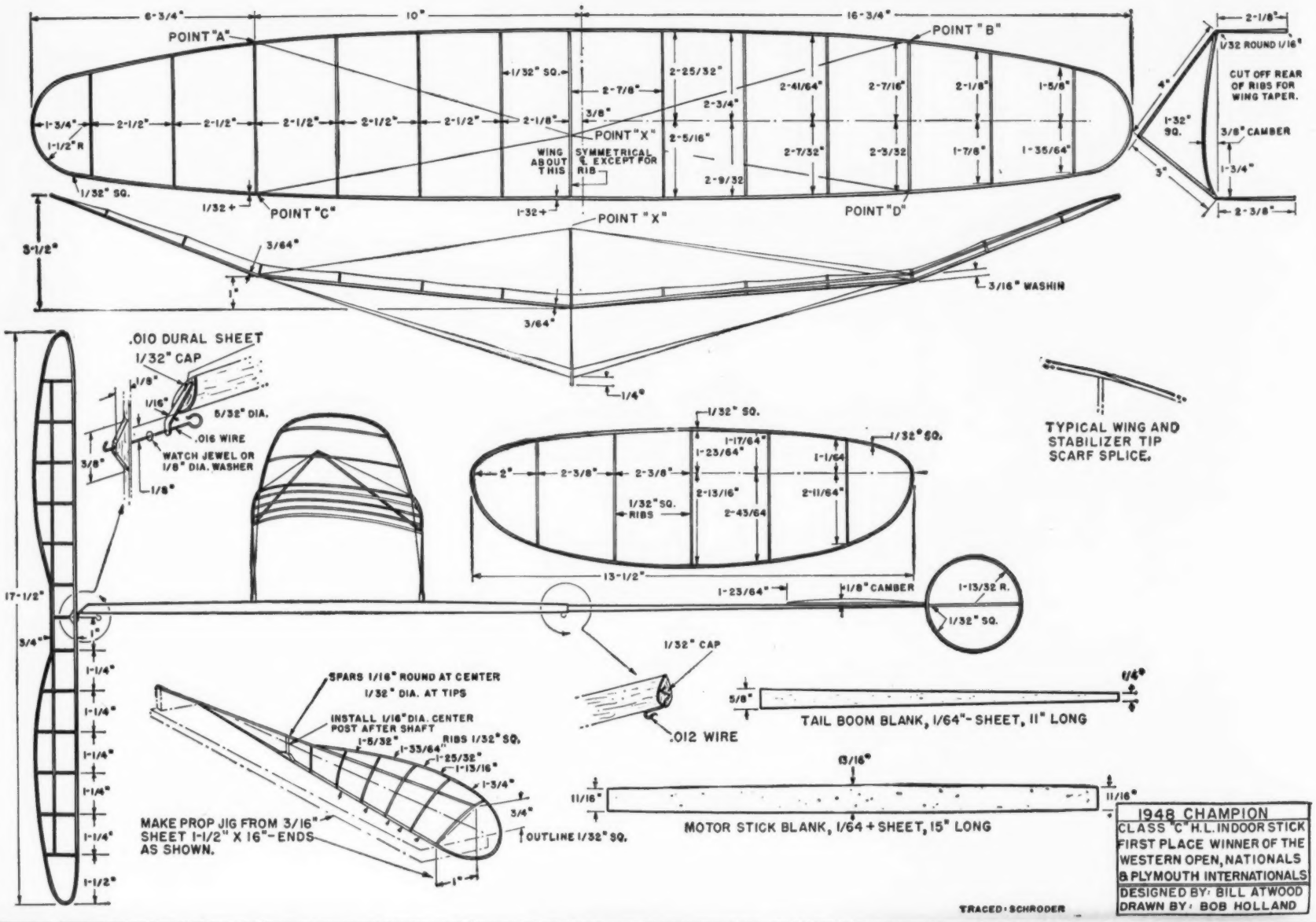
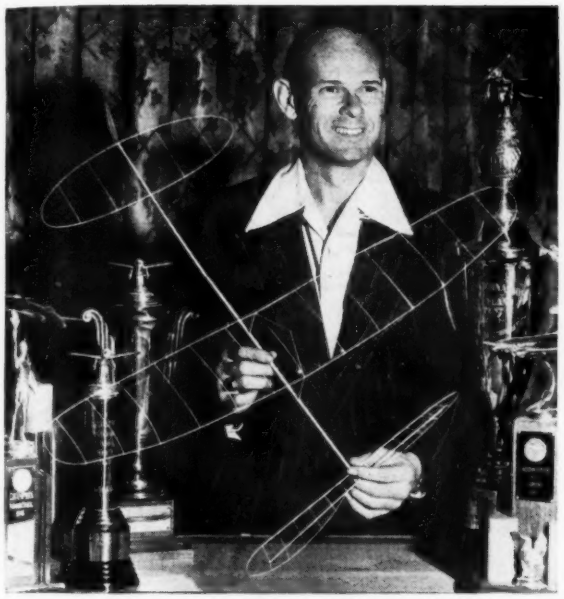

6-3/4"
10"
16-3/4"
POINT "A"
POINT "B"
POINT "C"
POINT "D"
POINT "X"
1/32" SQ.
2-7/8"
2-25/32"
2-41/64"
2-7/16"
2-1/8"
1-5/8"
3/8"
2-3/4"
2-5/16"
2-7/32"
2-3/32"
1-7/8"
1-35/64"
2-9/32"
WING ABOUT THIS
SYMMETRICAL EXCEPT FOR RIB
1-3/4"
2-1/2"
1-1/2" R
1/32+
1-32+
3-1/2"
3/64"
1"
1/4"
3/16" WASHIN
2-1/8"
1/32 ROUND 1/16"
CUT OFF REAR OF RIBS FOR WING TAPER.
4"
1-32" SQ.
3/8" CAMBER
1-3/4"
3"
2-3/8"
.010 DURAL SHEET
1/32" CAP
1/8"
1/16"
5/32" DIA.
.016 WIRE
WATCH JEWEL OR 1/8" DIA. WASHER
3/8"
17-1/2"
3/4"
1-1/4"
1-1/2"
TYPICAL WING AND STABILIZER TIP SCARF SPLICE.
1-17/64"
1-23/64"
1-1/64
2-13/16"
2-11/64"
2-43/64
1/32" SQ. RIBS
13-1/2"
1-23/64"
1/8" CAMBER
1-13/32 R.
SPARS 1/16" ROUND AT CENTER
1/32" DIA. AT TIPS
INSTALL 1/16" DIA. CENTER POST AFTER SHAFT
1-5/32"
1-33/64"
RIBS 1/32" SQ.
1-25/32"
1-13/16"
1-3/4"
3/4"
MAKE PROP JIG FROM 3/16" SHEET 1-1/2" X 16"-ENDS AS SHOWN.
OUTLINE 1/32" SQ.
1"
1/32" CAP
.012 WIRE
5/8"
1/4"
TAIL BOOM BLANK, 1/64"-SHEET, 11" LONG
13/16"
11/16"
11/16"
MOTOR STICK BLANK, 1/64 + SHEET, 15" LONG
1948 CHAMPION
CLASS "C" H.L. INDOOR STICK
FIRST PLACE WINNER OF THE WESTERN OPEN, NATIONALS & PLYMOUTH INTERNATIONALS
DESIGNED BY: BILL ATWOOD
DRAWN BY: BOB HOLLAND
TRACED: SCHRODER

DESIGNED BY - BILL ATWOOD
DRAWN BY - BOB HOLLAND
TRACED - SCHROEDER



1948 AMA NATIONALS

INDOOR STICK CHAMP

by BILL ATWOOD

IT is beginning to appear that a bald head, or at least a gray thatch on top, is a requisite to contest-winning performance. Over 21 years have elapsed since my first National Meet—the AMLA Contest of 1927 in Detroit, which was won by Aram Abgarian with a time of 5 min., 45 sec. I have entered practically every National Indoor competition since that memorable contest and, until last year, always wound up in the Also-Rans. On the other hand, Don Kennedy with only two years experience won the National Senior title in his first National Meet, at Kansas City, with a flight of 22:23.

You can build a stick model capable of 25 minute flights if you really want to!

The model described below has established a rather enviable record during the past flying season and has won every meet in which it was entered. Among the major contests won were the San Francisco Invitational Indoor Meet and the S.F. Record Trials held at the Sunnyvale Hangars. It also placed first at the All-Western Open in June with a high indoor time for the meet of 26:16, and won both the AMA Nationals at Olathe and the Plymouth Internationals in Detroit. The highest unofficial time yet recorded with the model is in excess of 28 minutes, and all previous contests were won with flights above 20 min. regardless of flying conditions or size of the flying site.

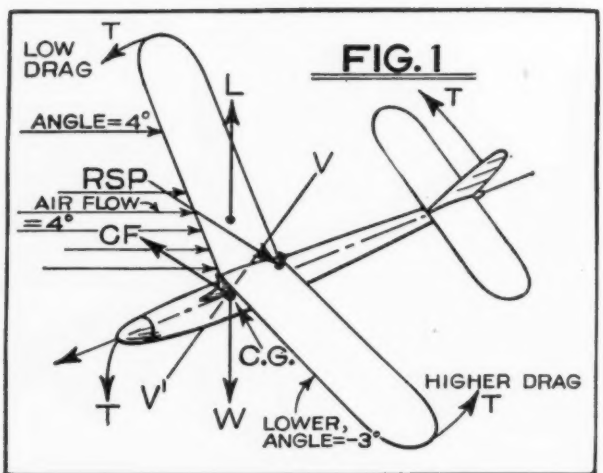
This entire article has been written with the thought that anyone who is interested in indoor models sufficiently to build one has enough ingenuity to fit his own methods and available materials to the general idea. For that reason we have strictly avoided the "Glue Rib B to Spar Y" method of description. The best way to learn to build and fly "Microflimsys" is to go to work and build one.

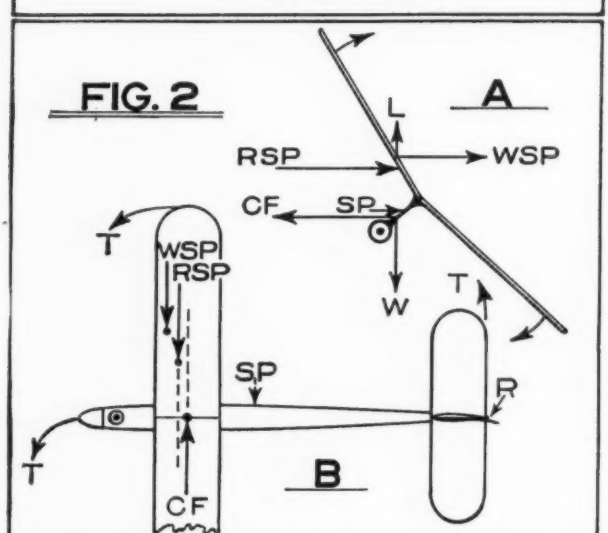
Some of the construction methods employed by the so-called "experts" are worthy of comment. An old plate glass windshield purchased from the local junkyard makes an excellent working surface for sanding and cutting wood. Plywood or a white-pine drawing board is best when laying out wings and tail assemblies. An 18" steel straightedge or a piece of steel bar stock will give vertical alignment to your razor blade and produce good square cuts when slicing balsa. Wood can be sanded to exact thickness by using strips of steel as thickness guides. Strips of steel 1" x 18" in a complete range of thicknesses can be purchased at a machine shop supply house. Simply place the wood between two strips of the required thickness and go to work with sandpaper on a block until you are down to the steel. This not only produces a full sheet of absolutely uniform thickness for the entire length of the sheet but avoids the common problem of sanding a sheet thinner on the edges than in the center. Some model builders use a single sheet of steel with a 2" x 18" slot cut out of the middle rather than two strips. One caution—when you start working on balsa thicknesses of less than 1/32", sand only away from the hand holding the wood—you'll ruin a good sheet of balsa and wind up with a handful of splinters if your sanding block catches the sheet on the backstroke.

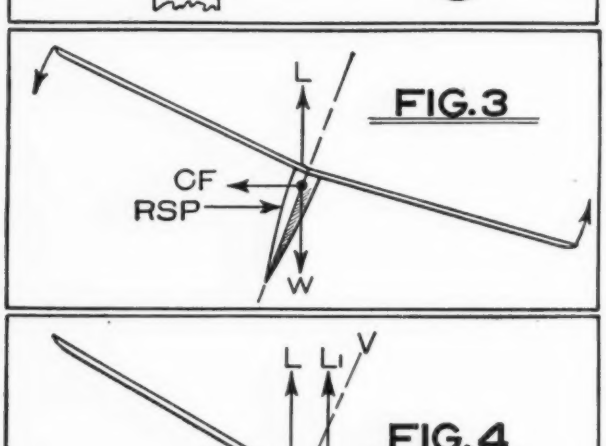
In our experience the general planform adopted for an indoor model seems to have little significance as long as the normal rules for area ratios are followed. To prove this point we built a square-tipped box kite of 150 inches area and turned in a 25 min. flight using a 16" balsa prop. In design (*Turn to page* 51)

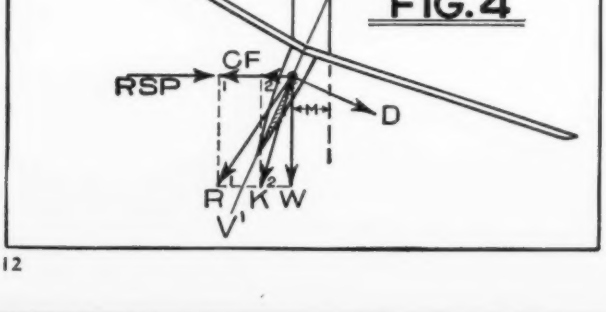
design forum

by CHARLES H. GRANT









ALL airplanes, model and full scale, are subject while in flight to (1) disturbing or upsetting forces, and (2) reactionary forces produced as a result of any displacement caused by disturbing forces. Therefore the problem of stability resolves itself into (1) reduction or elimination of disturbing influences, and (2) designing the airplane with such a configuration or form that righting influences will be set up when the airplane is rotated into some unnatural flight position.

It becomes obvious that any airplane will be disturbed least during flight when all forces that act on the airplane (whether momentary or continuous) are concentric or act at the same point. This fundamental fact is the basis for the theory of the center of lateral area (CLA) effect.

In last month's issue we indicated how a model rights itself and why, through the maneuver of a sideslip. We showed that a low center of gravity (CG) tends to roll the plane back into normal flight by producing a sideslip and a righting force couple between lift on the wings and the pull of gravity. This maneuver occurs during comparatively slow speed flight and does not include reactions produced by excessive centrifugal forces acting at the CG. During high speed flights—especially in heavy gas powered planes—disturbance from normal flight attitude often causes *skidding rather than sideslipping*. Such a maneuver is produced by disturbing forces suddenly banking the plane over and swinging the nose to the left against the torque. This produces a sudden change in the direction of flight to the left. Obviously the airplane mass tends to continue in a straight line of flight. This action tends to pull the airplane outward in the opposite direction from the turn and thereby causes it to skid so that the airflow approaches the airplane from the right as shown in Fig. 1.

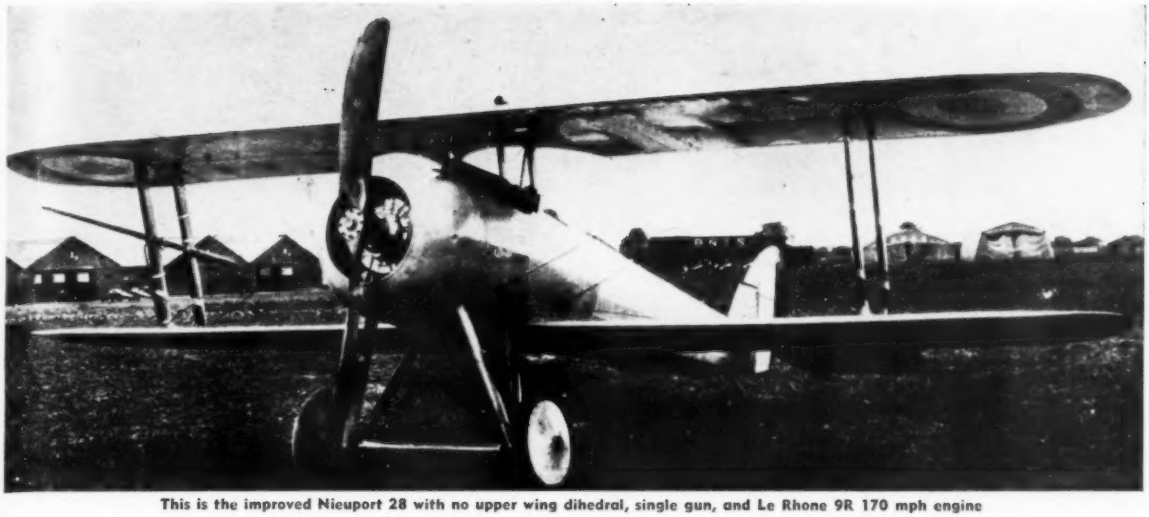
Due to this change in airflow direction, certain definite forces react on the airplane, forces that are *not* required for normal flight. First, a side pressure is produced. If the resultant acts at the center of mass or gravity, which is tending to pull outward, the rotating forces will be balanced and the airplane will not be disturbed. If the resultant side pressure acts to the rear of the CG but on a line that passes through the CG parallel to the thrust line, there will be no forces producing lateral roll, but there will be a tendency to rotate the airplane out of the turn about the vertical axis, V-V'. This alone tends to stabilize the airplane and produce recovery.

However, if the point at which the resultant side pressure acts is considerably above the center of mass, as shown by arrow RSP in Fig. 1., an unstable, highly disturbing force couple will result between side pressures (RSP) and the centrifugal pull of the airplane mass, indicated by arrow CF. This couple will cause an increase in bank with a consequent loss of lift on the wings so that the nose will drop. With the nose pointed at a more downward angle, the *speed of the airplane increases* under the pull of gravity in addition to the propeller pull. Then, *due to the greater speed* and the increased bank and *outward* swing of the tail, *the turn becomes sharper* with a resulting further increase in the centrifugal force (CF) and the side pressure (RSP). This force couple originally caused the increase in bank and speed; therefore when the force couple increases still more, the bank and speed also increases. This is a case where one effect increases the other effect, instead of one neutralizing or reducing the other. Once this cycle is started the disturbance increases until a crash results.

Airplanes with a high CLA—and therefore with a side pressure reacting above the CG when skidding—often fly very well. It is perfectly possible to fly airplanes of such design and have them react stably on many occasions, provided however *they are not thrown into a skidding turn* through the action of some flight force.

One way to prevent skidding during flight is to keep the plane climbing continually. With nose pointed upward there

(*Turn to page* 54)



This is the improved Nieuport 28 with no upper wing dihedral, single gun, and Le Rhone 9R 170 mph engine

Long slim fuselage is clearly evident in this view of Nieuport 28 from American squadron

WORLD WAR I

PART TWO

by ROBERT C. HARE

APRIL 14, 1918 was a memorable day in the history of American airpower. That was the day the first war-flight order was ever given to an All American squadron manned by All American pilots. The order posted for that day simply stated that Capt. Peterson, Lts. Reed Chambers and E. V. Rickenbacker were to take off at 6 a.m. and patrol the lines from Pont-a-Mousson to St. Mihiel at 16,000 feet, returning at 8 o'clock.

The squadron was the 94th—famous "Hat-in-the-Ring" squadron—with which the Germans were to become quite familiar, much to their sorrow. The three "lucky" squadron members were the envy of the other pilots, all of whom had rigorously trained for months for this very day. Every man had hoped to be picked for the first patrol of the 94th, and there was considerable jealousy as to who would be chosen first. Two additional pilots—Lts. Alan Winslow and Douglas Campbell were ordered to stand on the "alert" from 6 to 10 o'clock the same morning—just in case the patrolling three brought some Boche home with them.

The "lucky three" climbed into their ships, took off and climbed as they headed for the lines on the first All American patrol. Those on the ground watched enviously as they disappeared from view—the "lucky three" were getting the first crack at the Hun—or so they thought. After an uneventful patrol, the trio turned toward home—Peterson and Rickenbacker encountered a dense fog but landed safely on the 94th's field, while Chambers became lost and landed a short distance from the aerodrome.

The trio had no sooner landed, out of fuel, when an alert was sounded. Two German planes were reported in the vicinity. Campbell and Winslow immediately took off and disappeared into the fog. Almost immediately a report came in: "A German plane has just fallen in flames on our field", and before excited spectators could get to the scene, a second Albatros dropped out of the mist and crashed nearby.

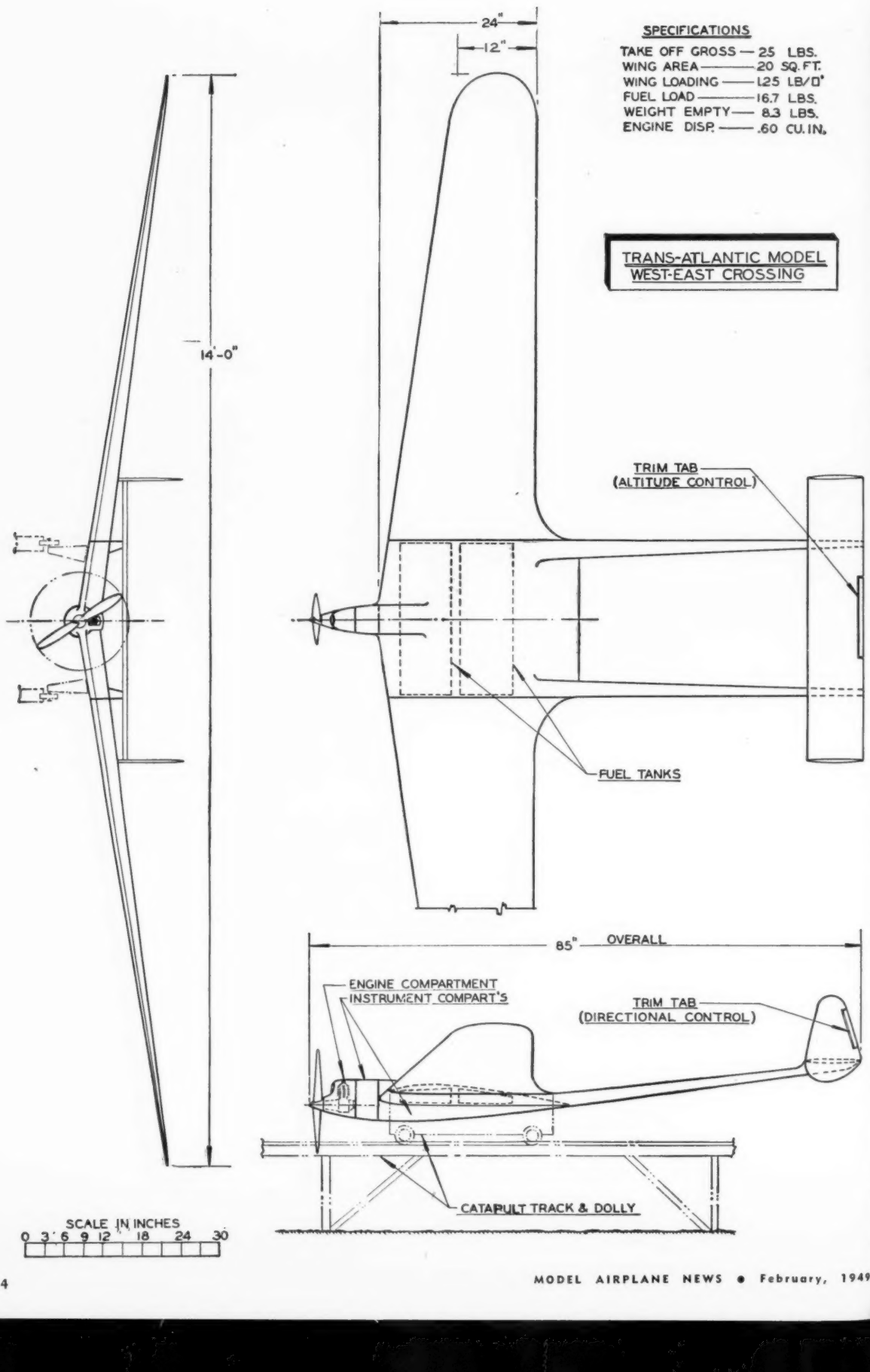
Both German pilots survived, and upon being interrogated said they had been ordered to attack two patrolling machines (Peterson and Rickenbacker) and had actually followed them to the 94th's field, where they became lost in the fog. They had come down low to find out where they were and were caught at about 500 feet altitude by Winslow and Campbell.

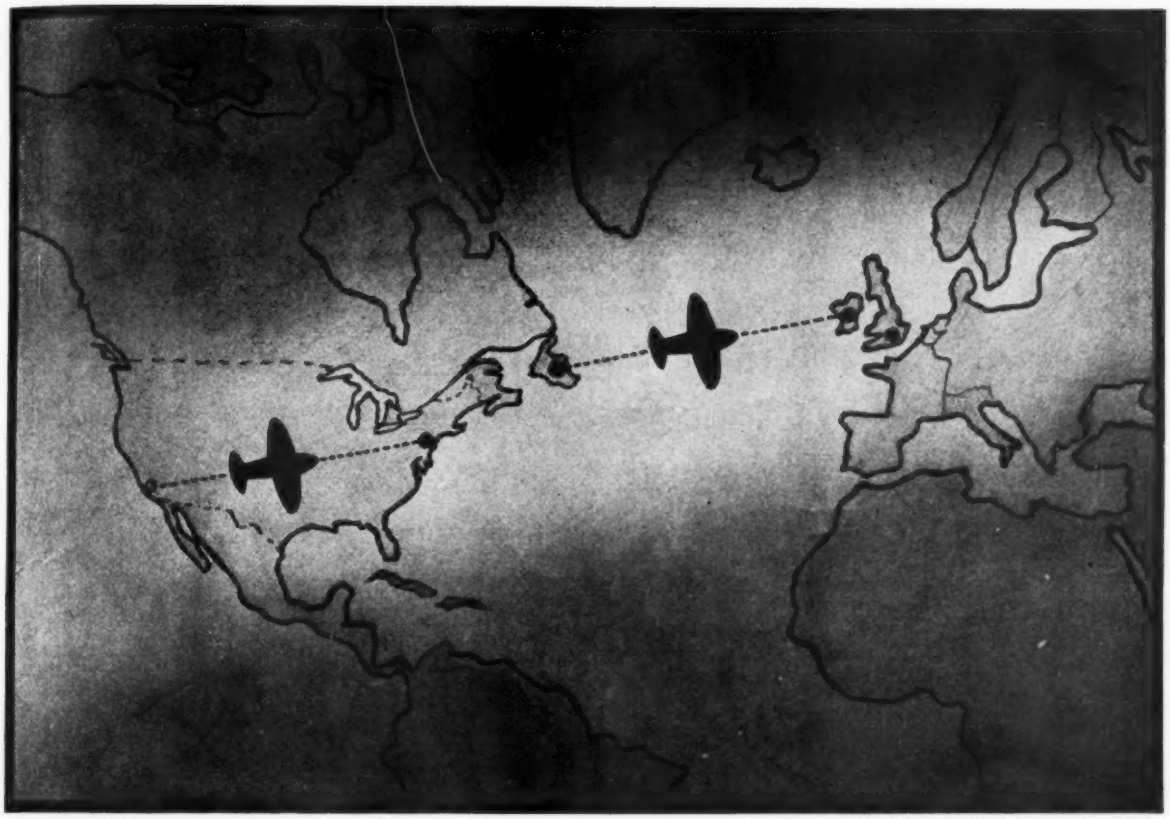
To the French peasants and townsfolk who soon gathered at the scene of the 94th's victories, the event also was a memorable one. "Les Americains", long promised, finally had arrived, and on their first day of operations—a foggy one at that—had accounted for two of the enemy. In addition, les Americains had performed this feat in a French airplane: the Nieuport 28. Winslow and Campbell received hundreds of phone calls and telegrams from all over the world congratulating them. The affair put immeasurable confidence in all American pilots because now they knew the Germans, with nearly four years of air fighting to their credit, were not unconquerable. And for the next three months, until July, the Nieuport 28 in the hands of American pilots aided substantially in the Allies' eventual mastery of the air over the Western Front.

STRUCTURE — American pilots soon learned that they had to take it easy with the Nieuport 28 in order to prevent stripping fabric off the wings. This enforced caution, with the pilots' lives in the balance, prevented them from getting all they could out of the 28. They held back purposely during dogfights so as not to strain the 28, and failed to follow up advantages over German adversaries that would have resulted in victories had they had complete confidence in their mounts.

The beautifully shaped wings that gave American pilots so much trouble were arranged as a single bay biplane cellule. Both upper and lower wings were built in right- and left-hand panels. Panels were made up of "I" beam wood spars with plywood, cap-stripped ribs, and leading and trailing edges of wood. Although the chords of upper and lower wings were different, the solid wood interplane struts were parallel because of identical spacing of the spars.

(*Turn to page* 38)


SPECIFICATIONS
TAKE OFF GROSS — 25 LBS.
WING AREA — 20 SQ. FT.
WING LOADING — 1.25 LB/D²
FUEL LOAD — 16.7 LBS.
WEIGHT EMPTY — 8.3 LBS.
ENGINE DISP. — .60 CU. IN.
TRANS-ATLANTIC MODEL
WEST-EAST CROSSING
24"
12"
14'-0"
TRIM TAB
(ALTITUDE CONTROL)
FUEL TANKS
85" OVERALL
ENGINE COMPARTMENT
INSTRUMENT COMPART'S
TRIM TAB
(DIRECTIONAL CONTROL)
CATAPULT TRACK & DOLLY
SCALE IN INCHES
0 3 6 9 12 18 24 30



Transcontinental: Los Angeles-New York 2440 miles

Transatlantic: Newfoundland-Ireland 1900 miles

Trans-Atlantic Gassie!

Sounds like a wild idea but it's a nice problem in model aeronautics

by GORDON LIGHT

THE distance from Newfoundland to Ireland across the Atlantic is 1900 miles. The first airplane flights were made over this route in 1919 with a flight time of about 17 hours; the trip is easy enough for today's transport airplanes. This particular leg of Atlantic flying falls within the performance of today's *model* airplane!

A trans-Atlantic gas model is probably not a very reasonable project to tackle seriously as far as actually building the model. But a paper study of the design problems is worthy of some dreamy thinking and preliminary calculations. Is it possible to build a model airplane capable of flying 1900 miles non-stop? Are model engines capable of continuous operation under such flight conditions? Can a model take off with enough fuel for this length of flight?

Trans-Atlantic flight is considered because an ocean crossing has always been symbolic of an airplane's ability to fly long distances non-stop. Actually, of course, a trip from San Diego to Atlanta (about 1900 miles) would be just as reasonable. An ocean flight does have the advantage of uniform terrain. A Pacific-to-Atlantic flight across this country might be easier from the standpoint of following the model's flight, but there is the complication of climbing to altitude shortly after takeoff to clear the mountains. A model starting on a long non-stop flight loaded with fuel would be in poor position to do any serious climbing.

The west-to-east direction of flight is essential whether the flight is over the Atlantic or over land. The prevailing winds are a big factor in stretching the model's cruising range into respectable distances; cruising speed is too low for anything but a helpful tailwind. On an east-to-west flight the model would be lucky if it got as far west as the Mississippi River.

Since this trans-Atlantic model is intended to be a model and not a small large-plane, some limit must be set on the total weight. 25 lbs. gross weight was selected. Performance increases with size, and limiting the weight makes the problem more difficult. Performance was based on model engines currently available. It was considered reasonable to allow modification of an existing engine, but the idea was to use a commercially available engine and not estimate performance with a still-to-be-developed super powerplant.

Design of a long distance model puts you knee-deep into the problem of getting the most miles per pound of fuel. Converting fuel into maximum mileage calls for cruising at the most economical airspeed; maximum range is usually obtained by cruising at about 40% above the stall speed. Maximum duration per ounce of fuel was an art carefully practiced during the early days of gas modeling when the rules limited the fuel load and not the engine run. Recently, fuel economy has been the least of the gas modeler's worries, but in a long distance model design it is just about the only worry. Approximately three-quarters of the takeoff weight will be fuel. The model will be on its own after launching—throttle settings and changes in trim will have to be fixed before launching, or handled by automatic gadgetry. The weight of any additional mechanism cuts into the fuel load that can be carried. Fuel tanks will have to be located to minimize the center of gravity shift from full to empty, and they must empty uniformly.

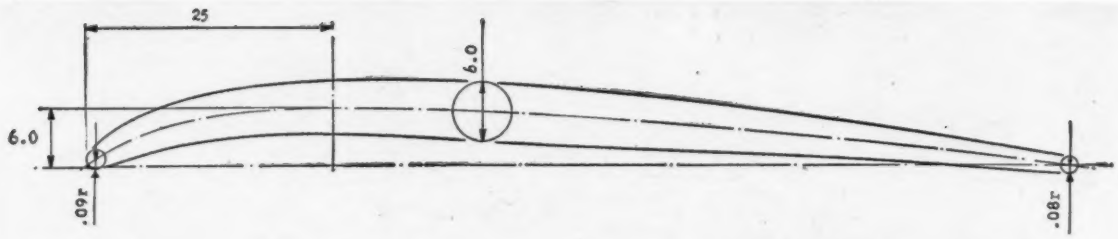
WEIGHT BREAKDOWN

Engine (Glo-plug ignition)	.8 lbs.
Airframe (including tanks)	7.0
Control equipment	.5
Fuel mixture	16.7
Total	25.0 lbs.

MODEL SPECIFICATION

Span 14 feet

(*Turn to page* 35)



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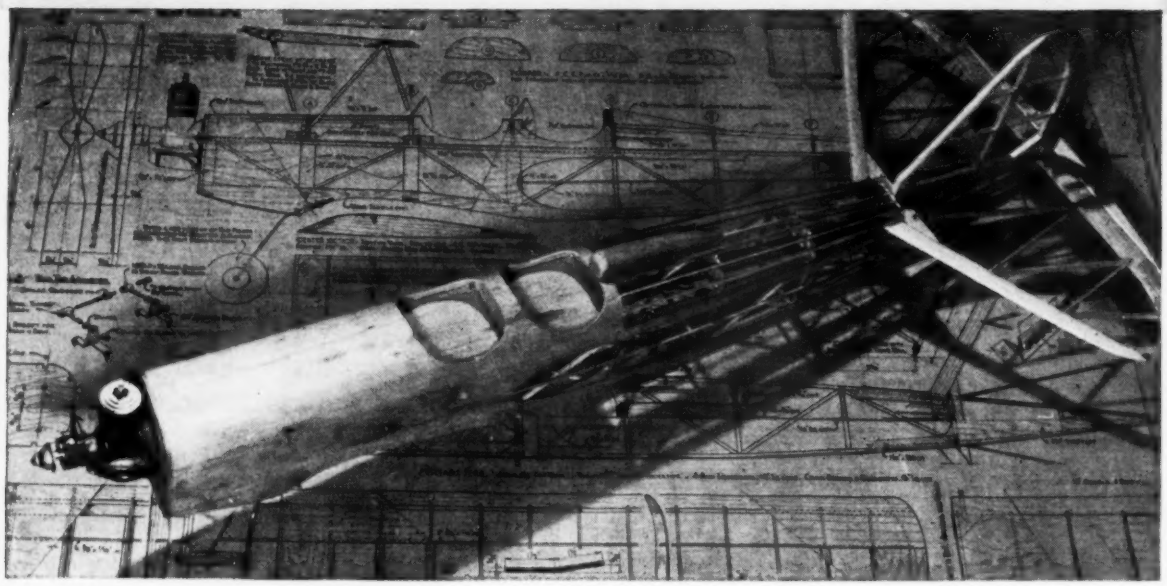
U	0.7	2.4	3.6	4.9	5.8	6.7	7.7	8.2	8.4	8.5	8.3	7.5	6.5	5.3	3.6	2.2	0
L	0.7	−.02	0	0.8	1.5	2.0	2.8	3.0	3.0	2.8	2.3	1.6	1.4	1.0	0.4	−0.3	0



FAULTLESS CHICK

by J. S. LUCK

IT has taken about three years to develop this little biplane. The *Faultless Chick* lays claim to being more than merely unorthodox as far as contest designs go; it is definitely on a par with any monoplane we have tried, from a performance standpoint, and can hold its own against the toughest competition.

Originally intended to be equipped with radio control, the model was carefully stressed for the extra weight. Although, somehow, installation of a radio receiver hasn't yet come about, there is every indication that it could be done and that it will prove very satisfactory. A *light* unit is all that is required; 12 ounces of ballast has been carried with ease on many tests, especially with glo-plug ignition. This weight is somewhat more than the all-up weight of a carefully designed receiver used with lightweight batteries.

This really is an exceptional ship, but it falls short in one thing: it is not the sort of model which, as the ads say, "can be built and flown in two hours." The special thin-airfoil wing requires careful, painstaking, exacting work. The cabane struts and trim tab adjusters require a craftsman's skill; haphazard butchery will only result in grief or, at best, difficulties in realizing precise flying trim. Careful workmanship will produce a model which may be adjusted to give any desired rate and angle of climb or glide. Turns may be varied with micrometer accuracy; and by keeping notes of the number of turns of the adjusting screws, and the wing incidence setting required for a certain flight pattern, it may be repeated as often as desired.

Construction is conventional with one new quirk added. The built-up structural angle used as main longerons is novel. The strength of this type section is many times that of a square section of equal weight. No matter how much doping may tauten the Silkpan there will be no "scalloping."

It is strongly recommended that a full size plan be used for building. This is available, and far more satisfactory from every standpoint than enlarging the very much reduced plate given with this text. This is particularly true of ribs, etc. which are of course accurately drawn full size on the original plan. For those who still would rather make their own layout the airfoil ordinates are given at top of this page.

Incidentally, this particular section, under the NACA system of designation would be 6/2.5/06. It is based on the scientifically established parameters for low-speed (model) airfoils recommended by Prof. F. W. Schmitz. The wing is extremely "gust sensitive", a term which despite its somewhat negative sound describes a feature highly desirable in small models. It means, in common terms, that even a slight additional wind velocity is utilized to gain further altitude. Any violent or dangerous upsetting of stability is counteracted by a large stabilizer. The

Heretofore biplanes have been just novelties—here's a contest performer!

ship remains safely stable.

There seems to be little to be gained by describing a detailed step-by-step construction procedure. This is no ship for a "first attempt", and anyone who has already had a couple of models' worth of building experience has developed an individual and preferred construction procedure anyway.

However, it is suggested that the fuselage sides be built in the usual manner—one on top of the other, over the plan; that the built-up structural "angles" be completed after the main framework is assembled; and that the wing panels be constructed mostly "in air" until sheeting and capstrips are added. The dihedral is 4" for each tip of both top and bottom wings. This gives the bottom wing, which is 3" less in span, a slightly greater dihedral *angle*. That is as it should be. Dihedral should be measured from highest point of the root rib uppercamber to the corresponding spot on the tip rib.

Although the plans show installation of an *Arden .199* the ship performs well with an *Arden .099*. If the latter is used it is suggested that the firewall be moved forward 3/16" in order not to upset the C.G. location. Similarly, if a *Bantam* is chosen the firewall should be moved back about 1/2" to compensate for the greater overall length of this powerplant and the added weight of the mounts. In all installations the 2-1/2° right thrust should be built in. Correction to thrust offset, if desired later, may be made by adding thin washers behind the motor mounts.

The propeller design shown has proven ideal for the *Arden .199* and this particular ship. Other makes of motors, even of the same displacement, will not necessarily require the same prop. A biplane, being more sensitive to torque, should take advantage of the gyroscopic action of a heavy prop. Birch is an ideal wood and despite its hardness is easy to carve.

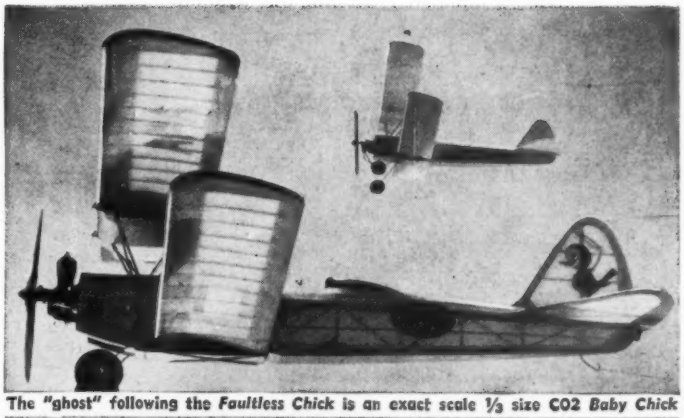
The cabane struts when carefully made are exceptionally strong. The front strut assembly may be fastened in several positions on the wing platform. Incidence is thereby variable much more satisfactorily than by the usual technique of adding little loose hunks of "thin 1/16" under leading or trailing edge. The lower wing incidence is fixed at +1-1/2°. Wings are removable and are held in place with rubberbands. The bands should not be too heavy—about 1/16" square in 4" loops will do, and not more than 3 bands to each wing. Dowels should be kept short so that the rubber will slip off easily in the event of a hard landing.

With the top wing set at the +3° incidence, with stab trim tab neutral, and C.G. on the thrust line at about 3" back of the top wing L.E., the ship should glide in the proper attitude. If it exhibits marked tendencies to do otherwise move the C.G. until the worst that can be said of the glide is that it seems a little fast or that it is mushy. Make finer adjustments with the trim tab. It is suggested that with glo-plug ignition, where it may not be so easy to shift weight, a small lead button be used as a balance. A quarter of an ounce attached to the tail skid is guaranteed to cure the worst nose-down tendency. A little lead shot inside the cup-shaped prop washer of the *Arden* could turn a stall into a dive quite easily.

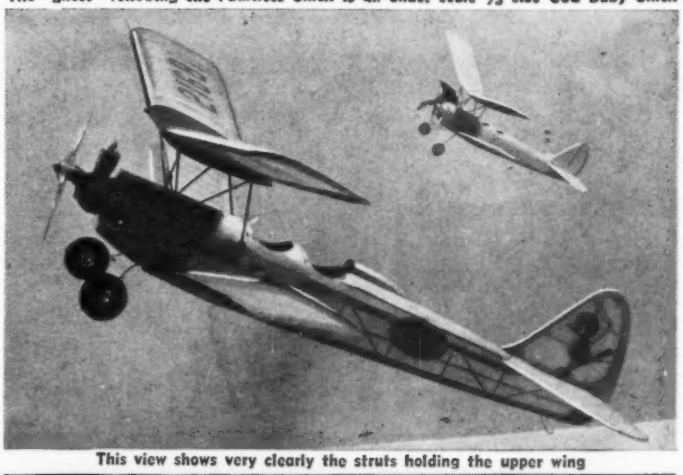
It is with regret we must admit that even the otherwise aptly named *Faultless Chick* has one undesirable characteristic which should be cautioned against. The ship must not be allowed to fly in right circles under high power unless the flight path radius is *at least* 300 ft. The reason is clear. With thrust offset to the right the ship in a right bank will be pulled groundward in a tight spiral power-on dive. The *Chick* could very likely take a crash of this sort in its stride, but—can you? This difficulty only obtains when using a motor with power equivalent to the *Arden .199*. With the smaller *.099*, the *Chick* is really *faultless*, but performance is naturally not as high.

An indication of the ruggedness of this light ship (18 oz. with wireless ignition) is that the *Chick* in the pics is a 2 year old veteran. The fuselage was lengthened and had to be rebuilt only because it looked somewhat battered. Oh yes, one diagonal strut was replaced last year, too!

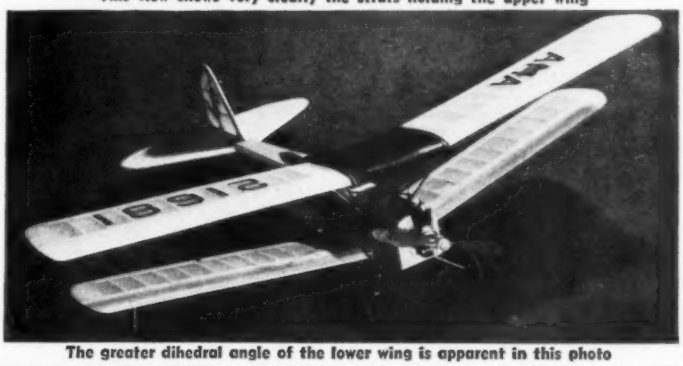
(*Turn to page* 56)



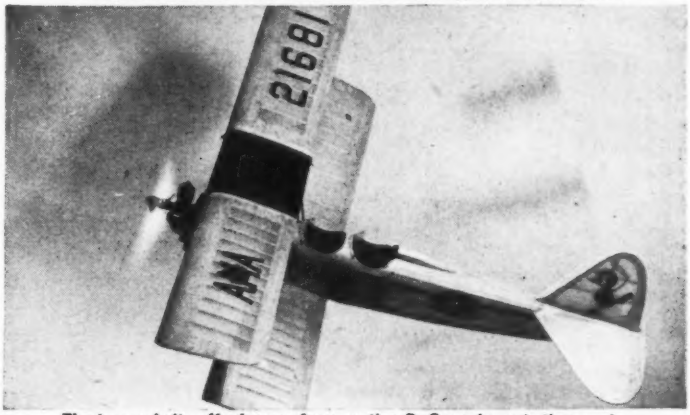
The "ghost" following the *Faultless Chick* is an exact scale 1/3 size CO2 *Baby Chick*



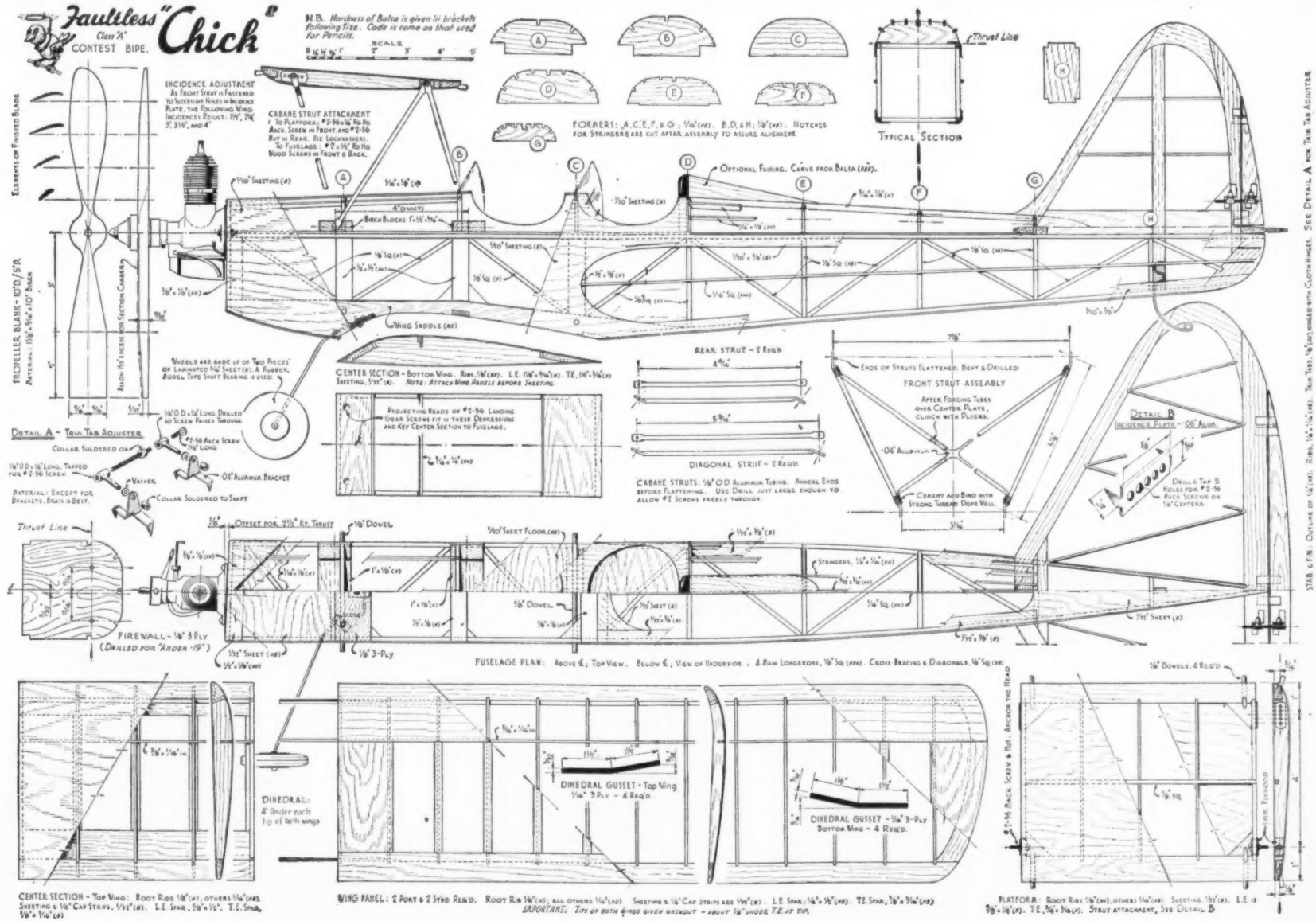
This view shows very clearly the struts holding the upper wing



The greater dihedral angle of the lower wing is apparent in this photo



The two cockpits afford space for mounting R. C. equipment, timers, etc.


Faultless "Chick"
Class "A" CONTEST BIPE.
N.B. Hardness of Balsa is given in brackets following Size. Code is same as that used for Pencils.
SCALE
INCIDENCE ADJUSTMENT
CABANE STRUT ATTACHMENT
FORMERS: A, C, E, F, 6 G; 1/16" (#2). B, D, G, H; 1/16" (#2). NOTCHES FOR STRINGERS ARE CUT AFTER ASSEMBLY TO ASSURE ALIGNMENT.
TYPICAL SECTION
Thrust Line
OPTIONAL FAIRING. CARVE FROM BALSA (#2).
WING SADDLE (#2)
CENTER SECTION - BOTTOM WING. RIBS, 1/16" (#2). L.E. 1/16" x 1/16" (#2). T.E. 1/16" x 3/16" (#2). SHEETING, 1/32" (#3). NOTE: ATTACH WING PANELS BEFORE SHEETING.
PROJECTING HEADS OF #2-56 LANDING GEAR SCREWS FIT IN THESE DEPRESSIONS AND KEY CENTER SECTION TO FUSELAGE.
REAR STRUT - 2 REQ'D.
DIAGONAL STRUT - 2 REQ'D.
CABANE STRUTS: 1/8" O.D. ALUMINUM TUBING. ANNEAL ENDS BEFORE FLATTENING. USE DRILL JUST LARGE ENOUGH TO ALLOW #2 SCREWS FREELY THROUGH.
ENDS OF STRUTS FLATTENED, BENT & DRILLED
FRONT STRUT ASSEMBLY
AFTER FORCING TUBES OVER CENTER PLATE, CLINCH WITH PLIERS.
.06" ALUMINUM
CEMENT AND BIND WITH STRONG THREAD. DOPE WELL.
DETAIL B
INCIDENCE PLATE - .06" ALUM.
DRILL & TAP 5 HOLES FOR #2-56 RACK SCREWS ON 1/16" CENTERS.
PROPELLER BLANK - 10D/5R.
MATERIAL: 1 1/8" x 9 1/4" x 10" BIRCH
ELEMENTS OF FINISHED BLADE
ALLOW 1/32" EXCESS FOR SECTION CARVING
WHEELS ARE MADE UP OF TWO PIECES OF LAMINATED 1/16" SHEET (#3). A RUBBER MODEL TYPE SHAFT BEARING IS USED.
DETAIL A - TRIM TAB ADJUSTER
COLLAR SOLDERED ON
#2-56 RACK SCREW 1/16" LONG
1/16" O.D. x 1/16" LONG, TAPPED FOR #2-56 SCREW
WASHER
.04" ALUMINUM BRACKET
COLLAR SOLDERED TO SHAFT
MATERIAL: EXCEPT FOR BRACKETS, BRASS IN BRIT.
Thrust Line
OFFSET FOR 2 1/2° RT. THRUST
1/16" DOWEL
1/16" SHEET FLOOR (#3)
STRINGERS, 1/16" x 1/16" (#4)
FIREWALL - 1/16" 3 PLY (DRILLED FOR "ARDEN '19")
1/32" SHEET (#3)
1/16" 3-PLY
FUSELAGE PLAN: ABOVE ℄, TOP VIEW. BELOW ℄, VIEW OF UNDERSIDE. 4 MAIN LONGERONS, 1/16" SQ (#4). CROSS BRACING & DIAGONALS, 1/16" SQ (#3)
STAB. & FIN. OUTLINE OF 1/16" (#2). RIBS, 1/16" x 1/16" (#2). TRIM TABS, 1/16" (#2) HINGED WITH CLOTH HINGES. SEE DETAIL A FOR TRIM TAB ADJUSTER.
DIHEDRAL: 4" Under each tip of both wings
DIHEDRAL GUSSET - Top Wing 1/16" 3 PLY - 4 Req'd.
DIHEDRAL GUSSET - 1/16" 3-PLY BOTTOM WING - 4 REQ'D.
1/16" DOWELS, 4 REQ'D
#2-56 RACK SCREW & NUT - ANCHOR THE HEAD
1/16" SQ.
1/32" BALSA FILLER
1/32" PLYWOOD
CENTER SECTION - TOP WING: ROOT RIBS 1/16" (#2), OTHERS 1/16" (#3). SHEETING & 1/16" CAP STRIPS, 1/32" (#3). L.E. SPAR, 1/16" x 1/16". T.E. SPAR, 1/16" x 1/16" (#3)
WING PANEL: 2 PORT & 2 STBD REQ'D. ROOT RIB 1/16" (#2), ALL OTHERS 1/16" (#3). SHEETING & 1/16" CAP STRIPS ARE 1/16" (#3). L.E. SPAR, 1/4" x 3/16" (#3). T.E. SPAR, 3/8" x 3/16" (#3)
IMPORTANT: TIPS OF BOTH WINGS GIVEN WASHOUT - ABOUT 1/8" UNDER T.E. AT TIP.
PLATFORM: ROOT RIBS 1/16" (#2), OTHERS 1/16" (#3). SHEETING, 1/32" (#3). L.E. IS 3/8" x 3/8" (#3). T.E. 3/16" x 1/16" (#3). STRUT ATTACHMENT, SEE DETAIL B

Here's a simple home-made stunt tank that will give good results

Stunt Tank

by JACK BAYHA

HERE'S a design for a fuel tank for U-Control stunt flying that ranks with the best. It is simple to make and gives foolproof service under tough flying conditions. It relies on the standard double vent construction and is unusually free of bubbling-fuel troubles. As supplied by the manufacturer, practically no engine is equipped with a tank that is suitable for control line flying.

Our stunt tank is not exceptionally original; it is an attempt at an easy-to-build tank that will give good service and will always feed the last bit of fuel. It will work in any position into which a control line model can get itself. Its use for free flight is however inadvisable because the tank will not feed properly in some of the flying attitudes a free flight model assumes.

The use of a round section is the trick for elimination of bubbling. When the model is in flight the fuel is always thrown by centrifugal force to the funnel shaped outlet tube which is always at the outside of the circle. The round section offers very little baffle surface to the fuel and it therefore causes a minimum amount of frothing and bubbling.

To make our tank we need what is known as "roofing tin," or "patch tin plate." This is a tin coated steel sheet, about .010" thick, which can be cut with regular heavy scissors —it solders beautifully. You can get a sheet about 20" x 30" from your neighborhood hardware store for 50 to 75 cents. This will serve to make dozens of gas tanks and other parts.

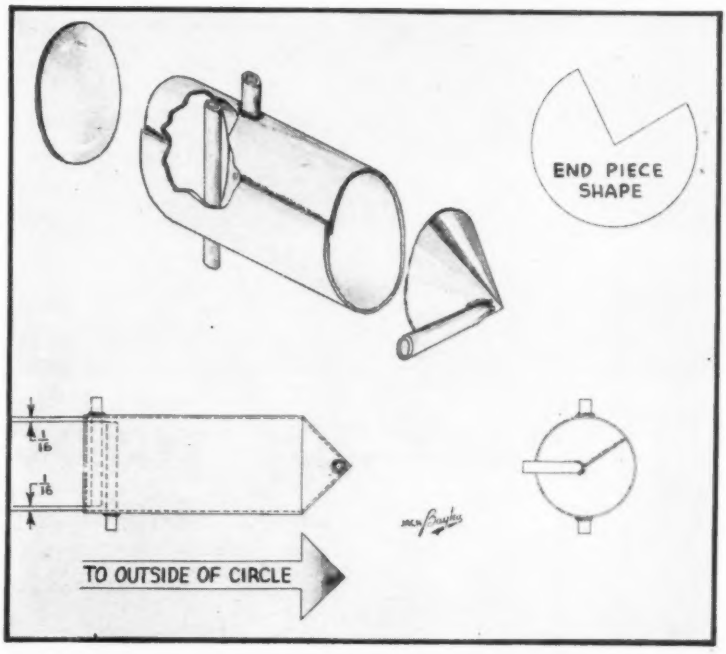
No sizes have been given in our drawings since each individual engine will be served best by a different size tank. The tank is made by rolling up a tube of tin, soldering an end cap on one end, installing vent tubes at top and bottom of the tank, then soldering on the funnel outlet end.

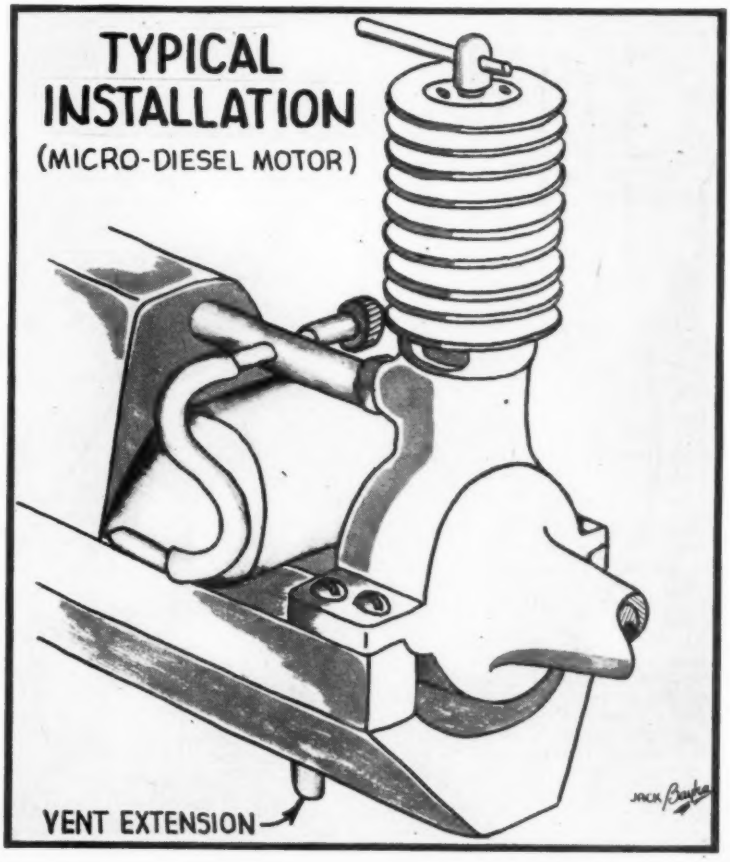
The funnel is made from a round piece of tin, notched as shown. The tubing is 1/8" copper tube, which is also obtained from the local hardware store. The clearance indicated at the ends of the vent tubes must be present.

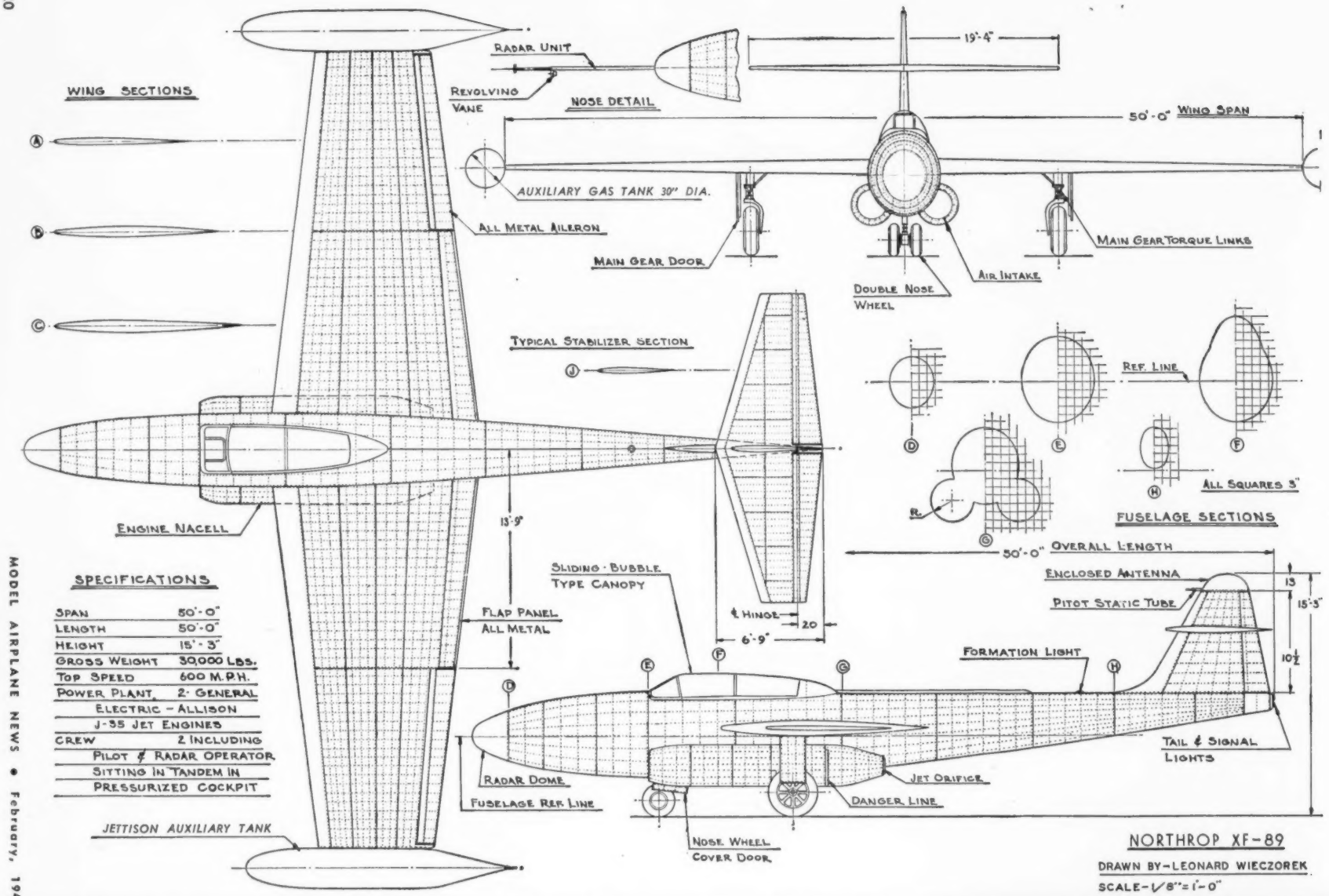
A secure soldering job is most important. Use plenty of solder and a good hot iron. Be careful not to move the parts until the solder is cool enough to become solid. Care in this operation will give a neat, tight, leakproof tank. In order to check the tank, fill it with water, close the vents with your fingers, and blow through the outlet tube. No leakage should be present. If there is a leak, resolder that area, then check the entire tank again.

The tank is best held in place by rubberbands, and the funnel must always point to the outside of the circle. We have used *this* tank for some time with many different engines and have always found it an excellent performer. With engines using the needle valve construction shown in the illustration (*Micro-Diesel*, *Deezil A*, *Movo*, Regular Ohllsons, etc.) it is recommended that the needle valve be rotated as shown. For rotary valve *Ohllsons*, *Drone* diesel etc. no valve modifications need be made.

An extension for the upright flight vent is recommended, as this keeps fuel out of the ship. The best technique for filling the tank is to use the outlet tube as a filler, by disconnecting it from the needle valve. The inverted flight vent (at top of ship) is closed with a finger, and the tank filled until fuel in a solid stream exits from the vent at the bottom of the ship.







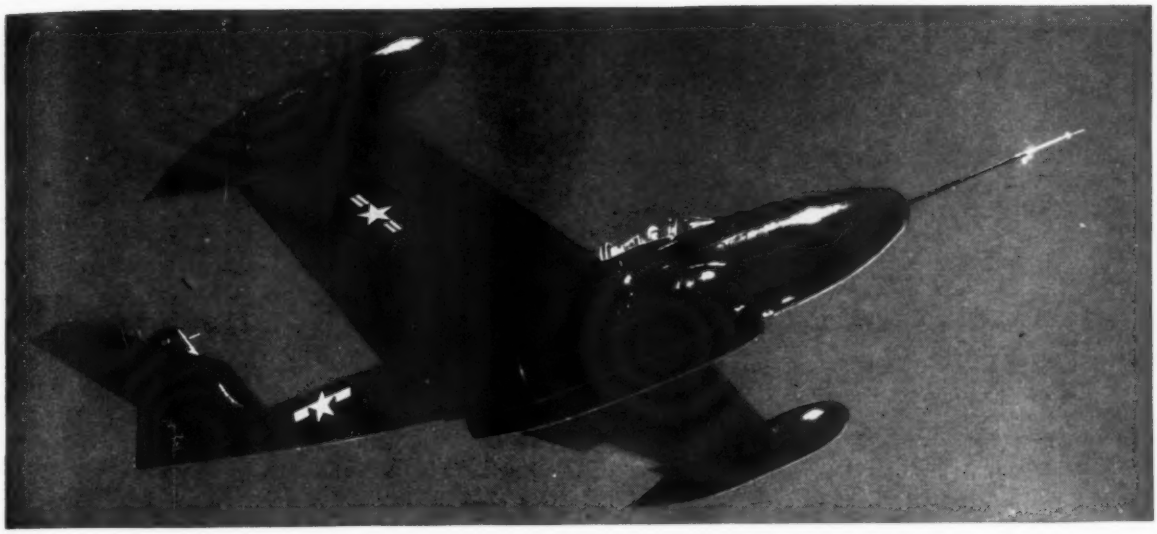
SPECIFICATIONS

SPAN	50'-0"
LENGTH	50'-0"
HEIGHT	15'-3"
GROSS WEIGHT	30,000 LBS.
TOP SPEED	600 M.P.H.
POWER PLANT	2- GENERAL ELECTRIC - ALLISON J-35 JET ENGINES
CREW	2 INCLUDING PILOT & RADAR OPERATOR SITTING IN TANDEM IN PRESSURIZED COCKPIT

NORTHROP XF-89

DRAWN BY-LEONARD WIECZOREK

SCALE-1/8"=1'-0"



DRAWN BY-LEONARD WIECZOREK
SCALE-1/8"=1'-0"

Black Widow Successor

by ROBERT McLARREN

ANY war in the future will be a radar war. And to fight that war the U.S. Air Force is rapidly developing both the flying and the electronic equipment required for near-automatic operations. For the sky warrior of the future may be only a monitor—a flying supervisor—of electronic equipment that does its job using only its own "eyes" and its own "brain." The nearest approach to such a sky-going electronics laboratory is the Northrop XF-89, our Plane of the Month.

Few aircraft manufacturers in the world are as well equipped by experience to produce a radar night fighter as is Northrop Aircraft Inc. of Hawthorne, Calif., for this company had designed the first and only "designed-for-the-purpose" night fighter used in World War II *before Pearl Harbor*. Their first introduction to radar actually occurred in December 1940 when President John K. Northrop conferred at Wright Field with Air Force radar experts on the latest developments in the field in Great Britain.

Radio Detection And Ranging was actually conceived as early as 1935 by the British, and by the spring of 1939 the British Air Ministry was operating a chain of Aircraft Warning Sets along the North Sea approaches; so that the initial development of radar was a pre-war program and not a "war-developed" electronic system. However, these early sets were a far cry from those used only a few months later and certainly not even comparable to those now in use. But such "Early Warning" search radars are still an essential part of electronic warfare.

After detecting the approach of aircraft by use of this equipment, the information is relayed to fighter aircraft by conventional radio, high frequency liaison equipment. The fighter is then "vectored" (given a direction and a distance) towards the approaching aircraft. When the fighter is within radar range of the target, the Ground Control Interception unit—which has also been following the fighter through the scope—sends the

(*Turn to page 42*)

The author fits engine cowl on No. 5 during a few odd minutes between classes. The elementary style of construction is evident

MIDGETS ARE FUN!

Although useful for contest work, midgets mean most to the flyer with limited time and space

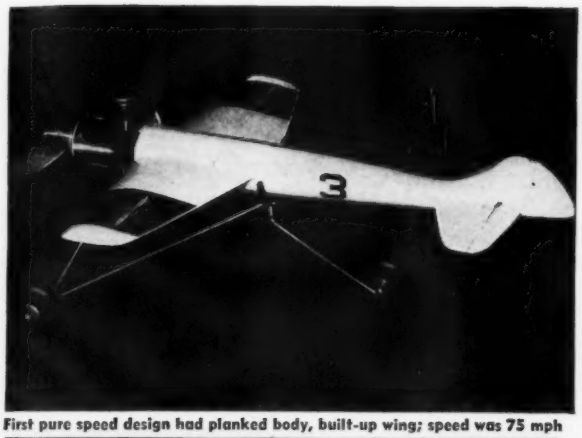
The original midget was utmost in simplicity and engine accessibility

THIS article is intended for all the people in the world whose veins hold airplane dope instead of blood. It is meant for the speed merchants and the stunt fans; it is meant for the diehard free flighters and anyone who will try anything once. It should hold the most interest for those modelers who are limited in space to build, space to fly, time or money.

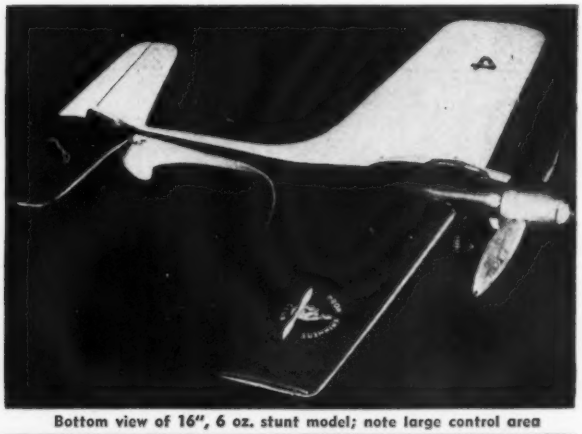
Not so long ago I was a strict free flight enthusiast. Nothing, I thought, could change my ways. I have since become a college student, and I am certain no one will dispute the statement that college boys are severely restricted in regard to time and space. Such was my plight. What could be done?

The love of the hobby was far stronger than the combination of my loyalty to free flight and the adverse conditions imposed by schoolwork. I turned to the smallest of "yo-yos" and found that they filled the bill completely. They are relatively inexpensive, require little space and little time, and they can be flown almost anywhere.

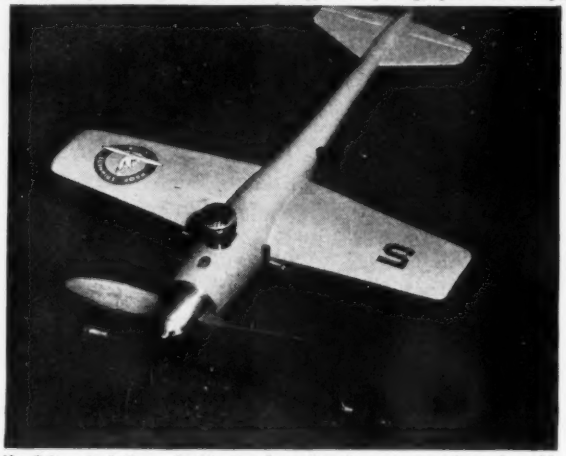
Since I knew little about control models and nothing about the really small ones, my first midget was designed for sheer simplicity and ruggedness. Number 2, as it was named (I had built one controliner before), was conservative in size, appearance and construction. It was all sheet balsa with a slab-sided fuselage, a conventional landing gear, and 14" wingspan. A *Mite* diesel was used for power and this choice of engine kept construction time down to a mere four evenings (with schoolwork), and kept the weight to 8 oz. The gear was eventually clipped off for



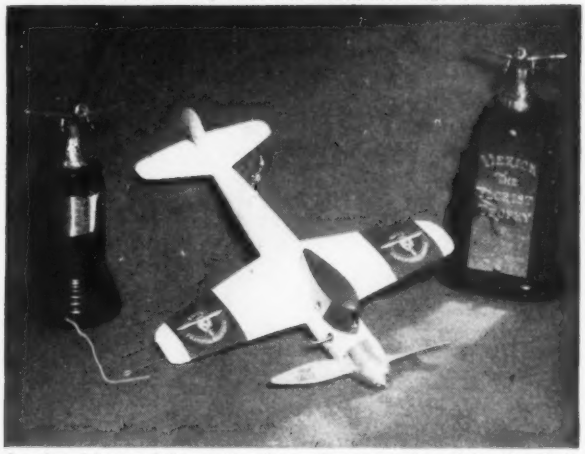
First pure speed design had planked body, built-up wing; speed was 75 mph



Bottom view of 16", 6 oz. stunt model; note large control area



No. 5 has sleek lines. Rudder has been found unnecessary in such a ship



Speed model copped the trophies shown. Pressure cowl was later discarded

by ROBERT L. HATSCHEK

more speed and maneuverability; this reduced the weight to 6½ oz.

The original model has now over 200 flights to its credit with no more damage than knocking the rudder off twice. There was much to be learned from this first sport job. It will perform a sort of loop and do wingovers with ease. Top speed (without gear) is 56 mph which has netted two 1st places and a 3rd at local contests. The model is so easy to fly that two non-modeling roommates flew it with no appreciable difficulty, although it must be said that some of their maneuvers were rather unorthodox. Number 2 is still in excellent condition but it has been retired in favor of more specialized models.

Number 3 was built on a Saturday in preparation for the C.M.A.A. contest in Columbus, Ohio, which was postponed for a week because of adverse weather. In the intervening week my roommate and partner in crime, Bob Tweed of the *Steubenville Sky Hawks*, was easily persuaded to temporarily drop his *Hornet* job (which was *very* slowly taking shape) and build a model similar to mine for the coming contest. His model walked away from all others to take first place in the Class I event while my Number 3 was relegated to fifth place due to unfortunate circumstances beyond anyone's control. It was later discovered that Number 3 was capable of a cool 75 mph under official conditions and placed first in the *Marietta Balsa Busters'* Class A event at a speed of 82 mph (not under A.M.A. rules).

But who wants to fly in flat circles, even if they are fast ones? Number 4 was designed strictly for stunting but it still turns in a good 60 mph. It has a 16" span and weighs 6 oz. which gives it a wing loading of 1 lb. per sq. ft. This model has a symmetrical wing section, an inverted feed tank (mounted in the inboard wing), and a rather unconventional fuselage. It does every stunt in the book and manages to write a few extra paragraphs of its own.

As yet untested, Number 5 is a development from Number 3 and should really put out with the mph. The design data may be obtained from the accompanying drawing.

Much valuable information has been derived from the several hundred flights of these models and similar ones constructed by others at this university. There is information regarding all phases of controline work, so read on brother, read on.

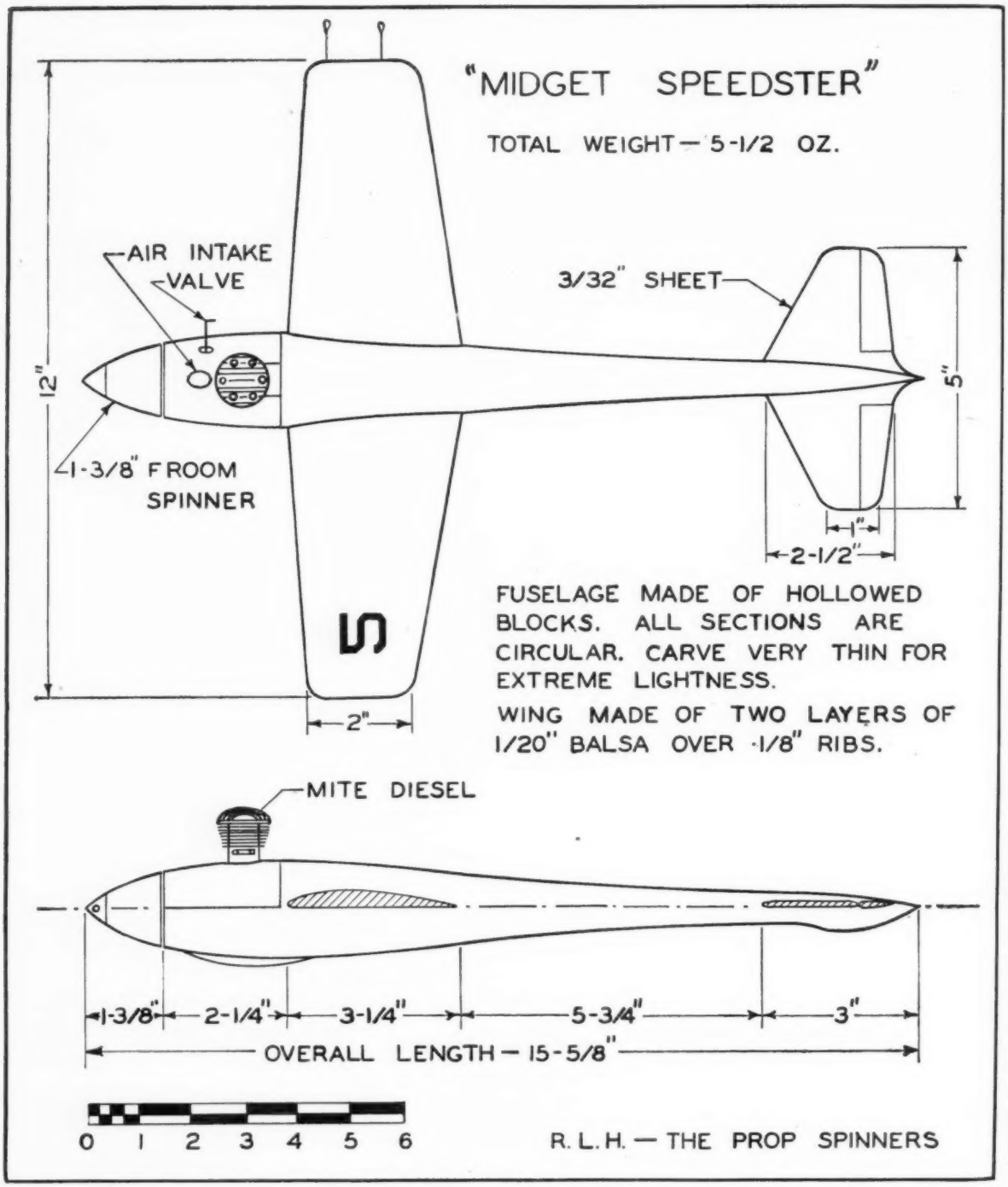
First and foremost, lightweight is *essential* for speed, stunt, and even general sport flying. Two models were built identical in every respect to Number 2 except that they both used *Arden .099* engines with conventional ignition. Their weight with landing gears was 12 oz., and the performance drop was enough to call them unsuccessful. Yes, they flew, but that was about all. For this reason all midgets should be powered by either disels, glow-plug engines, or engines using such fuels as *Liquid Dynamite* which will run an engine without ignition.

Next is a "don't." Don't make your midgets too small. Ample wing area is a necessity for ease of takeoff and flight. An airplane, no matter what its purpose, must fly first and *then* either fly fast or stunt. The undersized-wing model can be recognized by the way it "mushes" around the circle with its inherent high angle of attack. This manner of flight presents a high amount of drag for both the flying surfaces and the fuselage since they are not entering the airstream at their designed attitudes. Number 5 is about the optimum size for a speed model and Number 4 is the smallest possible for decent stunting. The next stunt model will have a span of about 20" for an even lighter wing loading.

Rudders have been found to be unnecessary for speed jobs and since these models fly in a circular airstream the rudder creates more drag than its appearance is worth. For stunt models, on the other hand, rudders are an absolute necessity and should be somewhat oversized.

One piece construction seems to be the most satisfactory. This type of structure gives a much greater strength and permits the use of a thinner fuselage shell. All the models pictured have only detachable cowls. Be certain the engine compartment is sealed perfectly from the rest of the model. Nothing weakens a model as much as fuel (particularly methanol) seeping into the structure.

In order to get the most efficiency from your wing, go to a little extra trouble and run the control lines through the wing—it pays dividends in both performance and appearance.



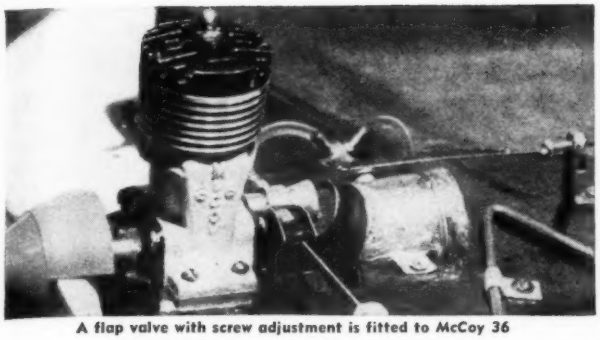
As for launching, most preferred is the hand-launch method. The launcher should run a few steps and throw the model tangent to or a little out from the circle in a slight climbing attitude. The flyer should be holding full up control at this time for added safety to the model. The only difficulty we ever experienced with this system was when an over-anxious launcher threw the model in towards the flyer; the flyer merely backed up a bit to regain line tension and control.

If you prefer dollies, make certain they are as light as possible, that they run freely and in a straight line, and that they are well keyed to the model. This last item is of extreme importance; because of the light weight of these midgets they tend to jump out of dollies prematurely more than their heavier counterparts in the larger classes.

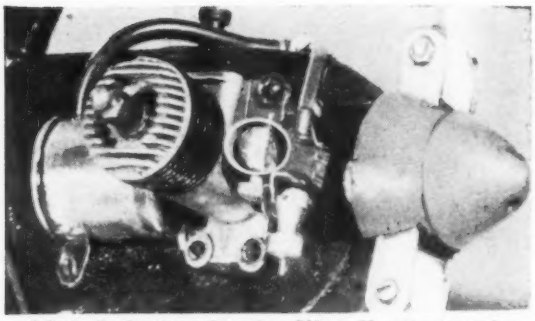
Choice of propeller and fuel depends, of course, on the individual model and engine. For the *Mite* powered speed models a 7½" diameter with 11" to 13" pitch has proven most satisfactory. Number 4 gives best performance with an 8" diam. 10" pitch prop. As with all control-liners (or all models for that matter), the propeller should be carved as thin as possible and polished to a fine finish.

One previously unmentioned advantage of these midgets is their inherent resistance to serious damage. This is quite naturally due to their light weight and relatively low speeds. Indeed some of these models have been inadvertently dived into the ground at angles up to 45° and at speeds in excess of 60 mph without serious injury! On a bet, Number 2 was once free flighted. The result? A

(*Turn to page* 36)



A flap valve with screw adjustment is fitted to McCoy 36



A butterfly throttle works well on *Ohlsson 23* with rotary valve

Glow Plug Throttles

by JERRY STOLOFF

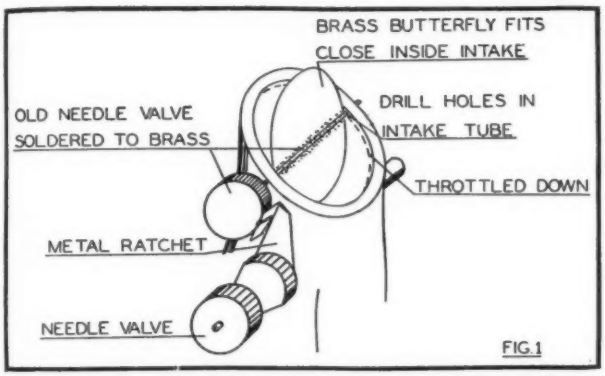


FIG. 1

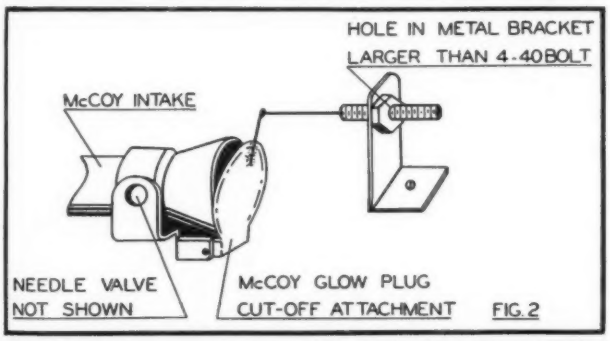


FIG. 2

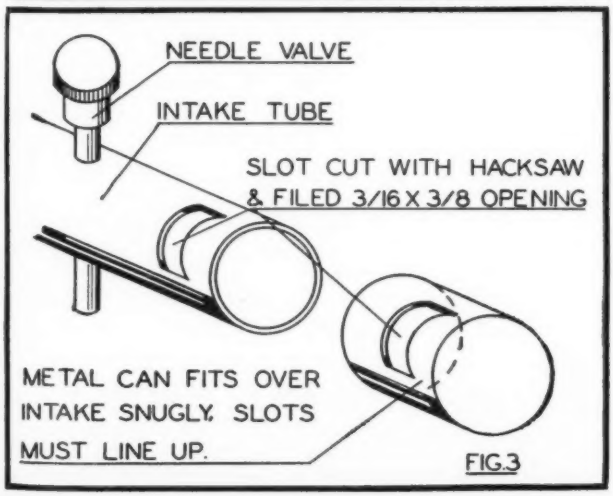


FIG. 3

SINCE the glow plug was introduced, a greater number of model builders have been able to fly because of the simplicity involved in starting their engines. The greatest percentage of glow plug engines are being used in U-control flying, and because of this the speeds have increased consistently. Not only have glow plug engines eliminated the ignition system but they also have allowed the models to be built smaller and lighter, which in turn also increased the speeds.

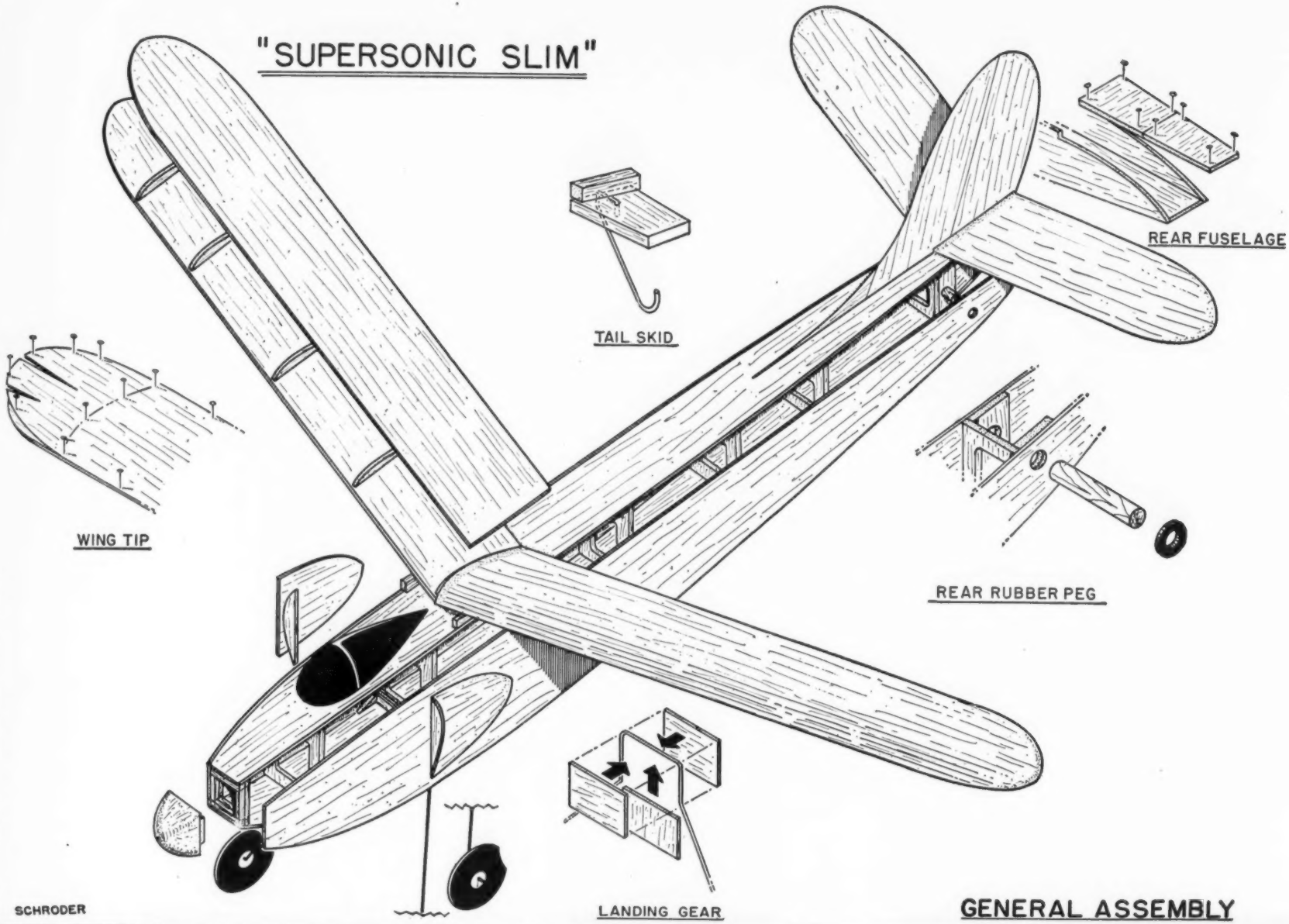
After careful deliberation I decided to take advantage of the glow plug in free flight. Without the additional weight of the ignition system, construction of the model could be made much stronger per unit of power loading and yet still be within the required weight rules. Also, because of the ease in starting a glow plug engine there is no reason for not getting all your official flights in at a contest.

I have worked on three types of throttles that will take in the majority of model engines on the market today. The only disadvantage of the glow plug engine in free flight is inability to throttle the engine down for test flying. By running the engine very rich it tends to slow the engine down slightly, but in most cases the engine will soon die out. By using the proper needle valve setting for high RPM and just reducing the air going into the engine, a very efficient throttle is obtained.

Fig. 1 shows the throttle attachment mounted in the intake of an *Ohlsson 23*. It consists primarily of a butterfly valve which can be adjusted minutely with a ratchet attachment. The butterfly is cut from thin sheet brass to the exact inside dimension of the intake tube. An old needle valve stem with a knurled knob is used for the ratchet. Two holes, same size as the needle valve shaft, are drilled in each side of the intake tube close to the top as shown in Fig. 1. The brass butterfly is set in the intake tube, the needle valve pushed through the intake tube holes and then soldered to the brass butterfly. A metal ratchet is cut from brass and bent to shape as shown, and a hole is drilled in it so the nut which holds the needle valve body will also hold it in place. The metal ratchet should be tight against the knurled knob of the butterfly in order that the vibration will not move the butterfly and change the RPM. Leave the butterfly open when starting the engine and close down the needle valve until the engine is running at its peak. By closing down the butterfly to the desired RPM it will be found that the engine will not stop due to too much fuel.

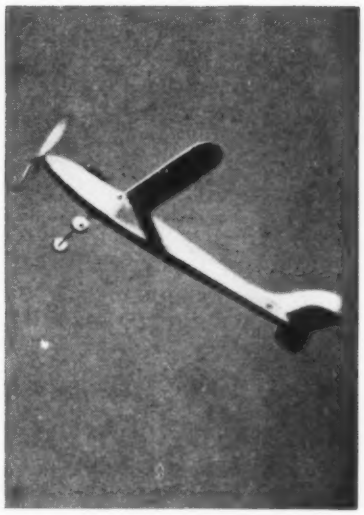
Fig. 2 shows the throttle attachment mounted on the intake tube of a *McCoy 36*. Duromatic makes a cutoff attachment which is utilized for a throttle. A metal bracket is bent to an L shape with two holes drilled in it. The hole on the top should be larger so that it will accommodate the bolt freely. Out of #.030 wire bend the two loops which are used for pivots. One end is soldered to the cover of the cutoff attachment; the other end is soldered to the adjustment bolt. The bracket is fastened to the plane, and by tightening the nut on the adjustment bolt the volume of air that goes in the intake can be increased or decreased as desired. A small piece of brass should be soldered to the metal bracket and fitted against the adjustment nut to form a ratchet.

Fig. 3 shows a glow plug throttle (*Turn to page 53*)



GENERAL ASSEMBLY

Bill seems to be somewhat puzzled at his brainchild



Here's *Slim* grabbing altitude

Supersonic Slim

by BILL WINTER

Bell Jr. holds while Walt Schroder packs the turns

This rugged, simple design is a fast stable flier and maneuvers can be repeated time after time

Slim is a simple ship but has racy lines

FOR simple construction, durability, and sheer flying fun *Supersonic Slim* is a tough guy to beat. Of all-balsa construction on a larger scale then usual for this type of ship, it has put in more than a hundred winder-wound flights, with no damage beyond the inevitable nicks from picking fights with tall trees. Designed for straight flight and a good rate of speed, it is good for a cross country dash of at least 1,000 feet any day of the week.

The original idea was for a high performance, all-sheet airplane with a realistic flight pattern. For us this meant a medium high flight (about 100 ft. altitude), at good speed and in a straight line. (However, it can be adjusted by rudder for turn in smaller areas.) Stability had to be of a high order to get an arrowlike flight, free of mushing, stalls and turns. And the airplane had to look different from the usual sheet-balsa job. No doubt you won't dispute that last, but *'Slim* really paid off, having some unexpected attributes that you never get with built-up construction. One of the pleasant aspects is its freedom from warps and changes in trim; take it out any time, wind or calm, wind it up full and let it go. It'll go every time, up wind or downwind. Glide is poor, being sacrificed for good power performance. We have used a special but simple adjustment for our desired flight pattern, and a few other special tricks as well, so wading through the directions will pay dividends.

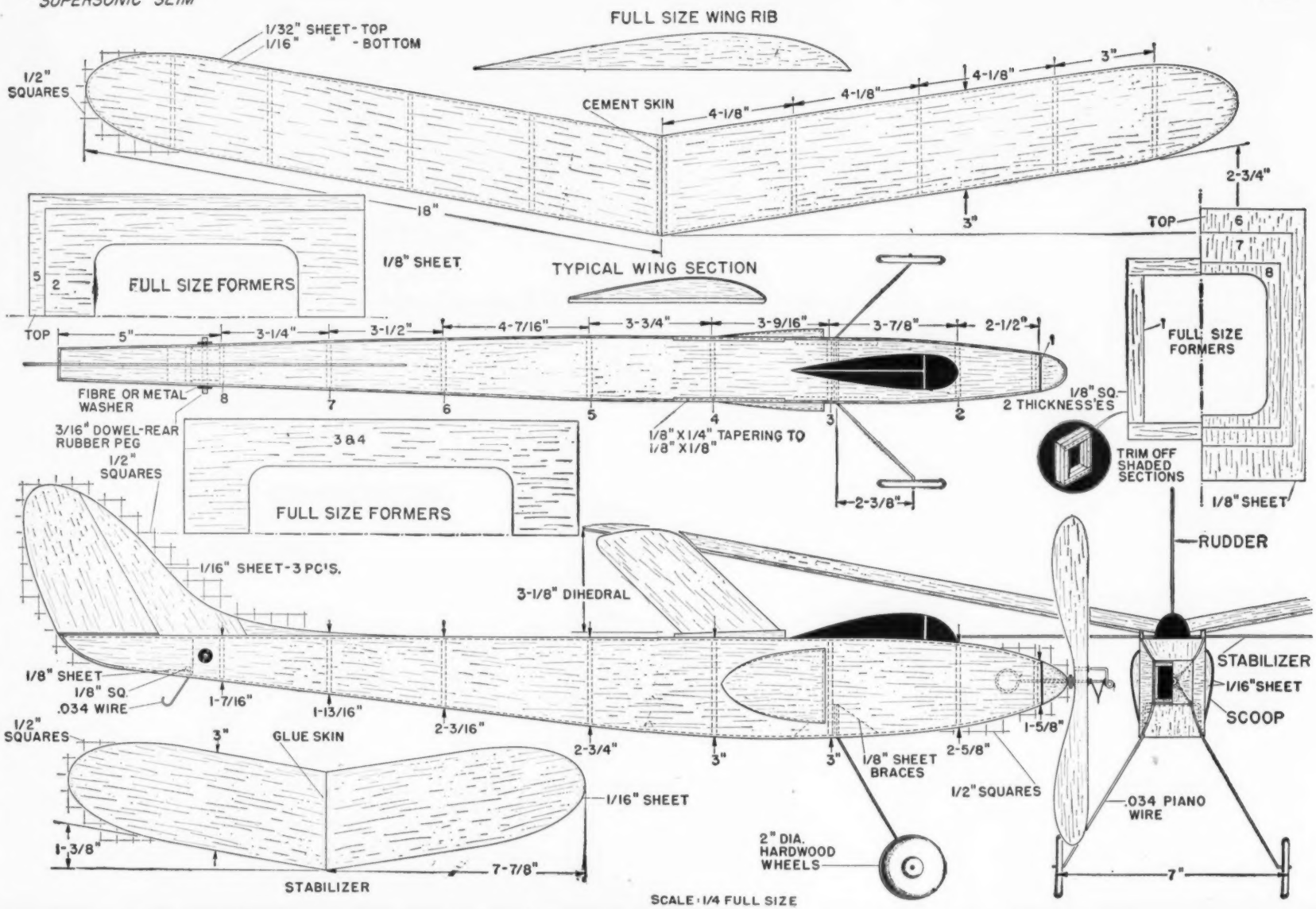
CONSTRUCTION—3" wide 1/16" thick sheet balsa is used for the bottom of the wing, fuselage and tail surfaces; bulkheads and wing ribs are soft 1/8" sheet. The top of the wing is 1/32" sheet. However, if 1/32" sheet proves hard to get in a 3" width, use the lightest and softest 1/16" sheet you can get for the top of the wing. Try to select medium hard sheet balsa for the fuselage. As long as the wood is not *very* hard—hence heavy, or too soft, mushy and lacking strength—it will be acceptable. Cut out the bulkheads shown on the plans, and the fuselage top, bottom and side pieces.

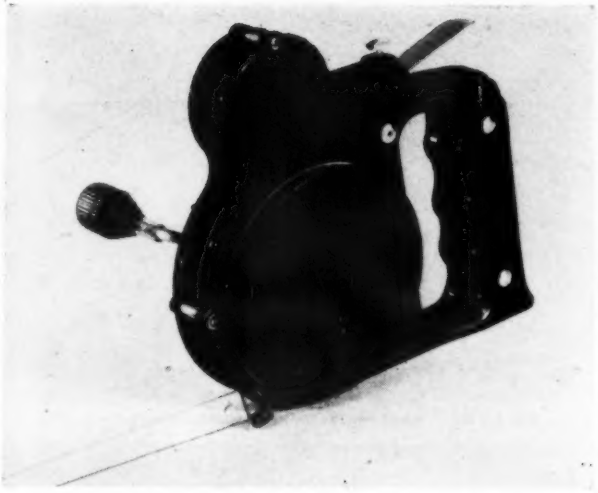
Glue bulkheads 3 and 4 in place on one side of the fuselage. (It will help to mark all bulkhead positions with a ruler.) Check the alignment with a triangle or any handy object that will indicate a right angle. When these bulkheads have dried, glue the opposite side in place. Before going further it is best to form the landing gear wire from .046" wire and attach it in position. The landing gear is held in place by the familiar balsa sandwich made from three plies of hard 1/16" sheet balsa. This sandwich is glued against the front face of bulkhead 3 and is re-enforced, as seen on the side view and in the detail, with gussets of 1/8" sheet balsa. Note that two gussets glue against the front of the sandwich and two more butt against the rear face of bulkhead 3 to support the landing gear from the rear. All gussets are cemented well to the

(*Continued on page* 40)

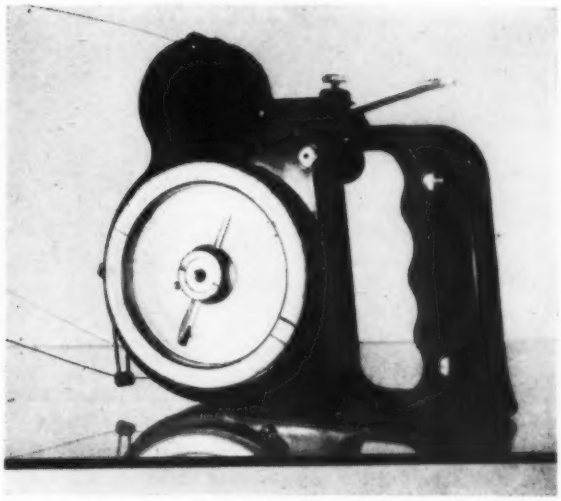
"SUPERSONIC SLIM"

SCHROEDER





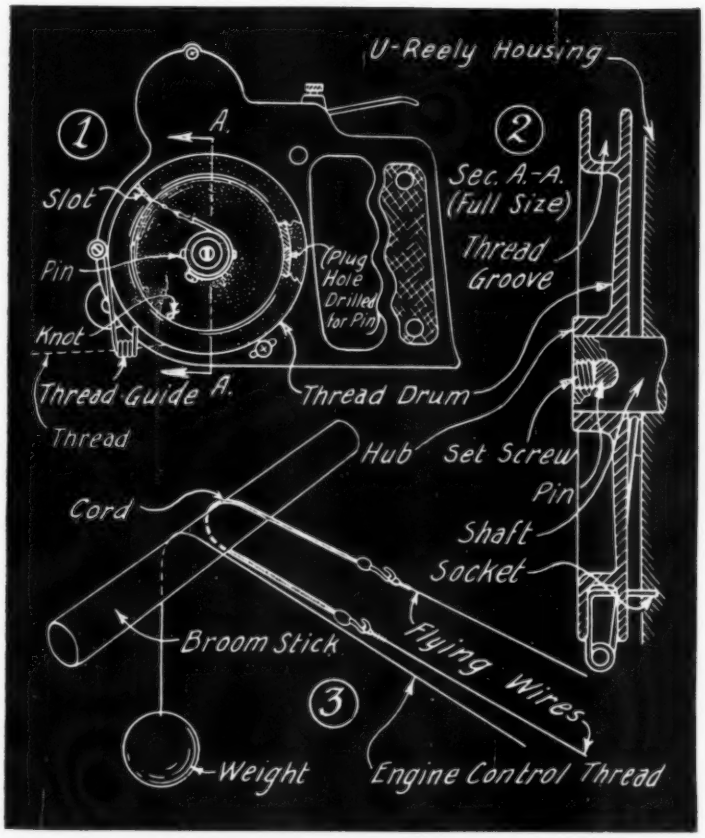
The finished job ready for work. Note guide for the third wire



Slot in rim of new drum holds third wire end, when not needed

Engine Control with U-Reely

by RAY RUSHER



ON a U-Control plane which has been equipped with an engine control thread and flown with an ordinary U-Control handle, this engine control has to be abandoned when a *U-Reely* control handle is used, unless a relay and an electric circuit for it are provided as in the *Remoto*. Here's an addition to the standard *U-Reely* control which enables you still to use the thread type of control.

A thread drum is attached to the *U-Reely* shaft and the engine control thread wound on it as shown in drawing 1. In this way the thread unwinds as the flying wires unwind and is wound up at the proper rate when the wires are reeled in. The engine control thread sags from the *U-Reely* control to the plane and can be grasped adjacent to the reel and pulled whenever desired for slowing down or stopping the engine.

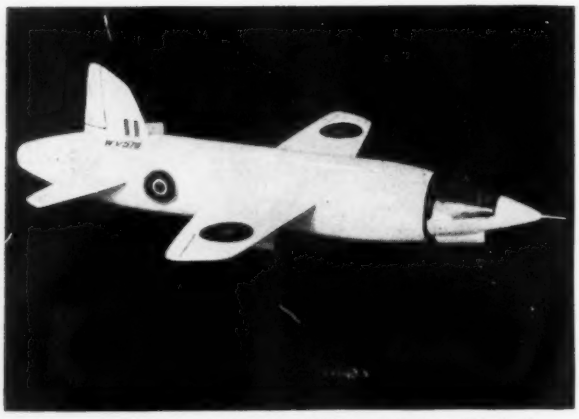
The thread drum is shown in crossection in drawing 2. The thread groove should be slightly larger in diameter than the wire grooves in the drum of the *U-Reely* for an engine control thread that is about the same diameter as the flying wires. This diameter was made slightly over 2-7/8" in the author's *U-Reely*. The outside diam. of the thread drum flanges may be about the same as the wire drum, or 3-1/2".

The engine control lever in the plane may be a spring returned timer arm as in Jim Walker's original *Fireball*, or a spring loaded air bypass valve or needle valve lever of a C.I. engine. Instead of operating an engine control lever, the control thread may be used for retracting and extending a landing gear, or operating a wing flap or other control surface or device.

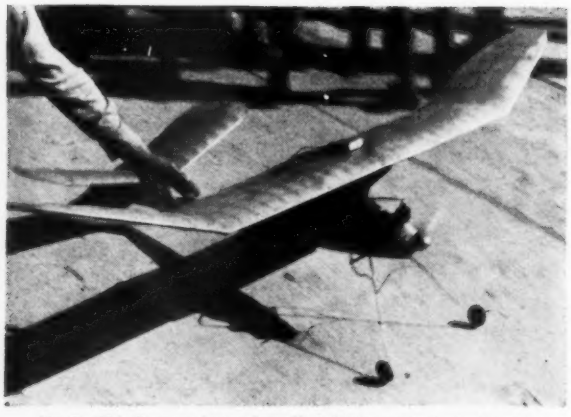
The thread drum is best turned from plastic for lightness. The next best material is a close-grained hardwood like maple. The thread groove must be accurately concentric with the shaft hole for maximum efficiency of operation. The way to insure this is to turn both while the blank for the drum is mounted on a wood disk screwed to the face plate of the lathe. The blank is 3/8" thick x 3-5/8" dia. and is cemented or glued to the face of the disk (after the face is turned and sanded square to the axis of rotation). When cementing the blank to the disk be sure to include a sheet of writing paper between the two so that the drum, after it is turned, can readily be removed from the disk. The thickness throughout the drum should be 1/16" except that it is thicker (about 5/32") at the hub.

Before mounting the blank for turning, drill a 3/16" hole into its edge 3/16" from the face that is to be turned. This hole is to receive a 3/16" wood or metal pin for pinning the drum to its

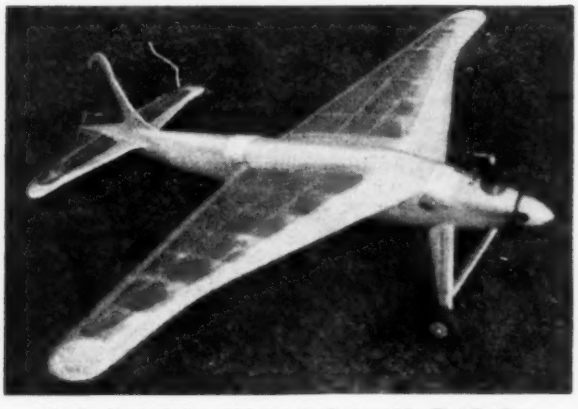
(*Turn to page* 50)



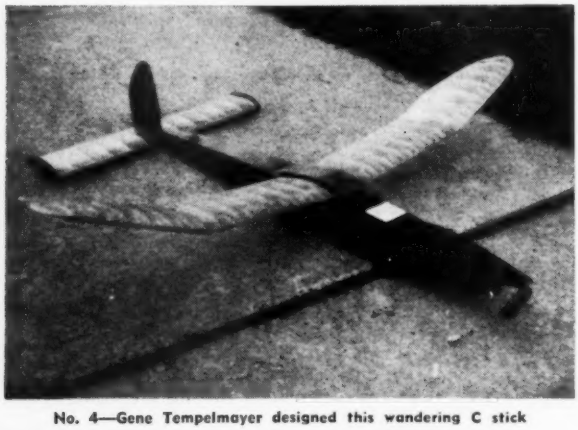
No. 1—Solid scale model of Miles M-52 by R. Sadler of England



No. 2—This German design from H. J. Meier sports butterfly tail



No. 3—*Manta* design which was finally tamed by Thul Brothers



No. 4—Gene Tempelmayer designed this wandering C stick

No. 5—D. Richardson adjusts his *Bikini*

No. 6—Slick Piper *Skycycle* by *John Porter*

AIR WAYS

News of Model Airplane Experimenters All Over the World

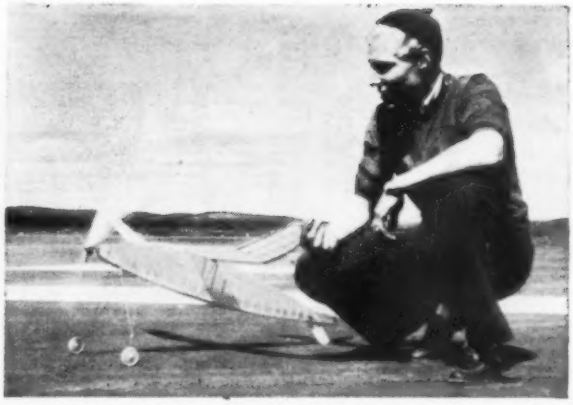
METAL PROPS. Modelers have sometimes used metal props to run-in new motors; these props are usually fairly heavy and help keep the motor rolling where it is stiff. The same modelers then attempt to use these props for contest work but find they cannot do so. Metal props are banned by AMA contest rules, a point many fliers overlook. This rule was set simply as a safety precaution; metal props have been known to cause considerable damage to objects with which they come in contact (including fingers) and must be treated with respect. We have been asked by AMA authorities to stress the fact that metal props are *verboten* for contest flying. Fliers have appeared at the flying field with these props and were greatly put out when told they couldn't use them. Read the rules, fellows, and abide thereby!

RADIO CONTROL AT THE NATS. As we noted in our November issue, the Radio Control event at the 1948 Nationals was really outstanding and many fliers who were not entered left Olathe vowing to be in on the fun in 1949. We don't want to be dubbed a wet blanket, but things were not as fine as they seemed at the Nats. R.C. event; and, as is usually the case, the contestants themselves are to blame.

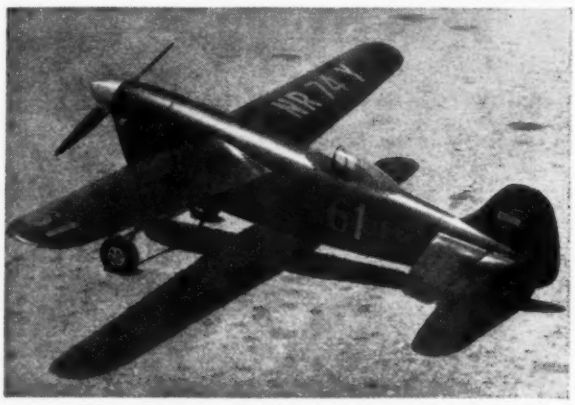
It seems that the F.C.C. had some of their Kansas City men attend the meet every day and make a detailed report to their superiors in Washington on the goings on—from the radio viewpoint, of course. This report was not very favorable to model aviation. The list of law infractions was a long one. Just a few of the points mentioned were: lack of frequency meters to check transmitters for out-of-band operation; failure to report to F.C.C. offices that out-of-home-district mobile operation would be undertaken; transmitter frequency often wandered out of band; transmitting equipment handled by unlicensed operators (with no licensed operators to stand by).

The list was considerably longer, but the point is that the R.C. fliers gave the F.C.C. a fine invitation to crack down on *all* R.C. flying. And this at a time when the AMA is doing its best to convince the

No. 7—This Grumman *Widgeon* will fly in the spring, says H. Messmer

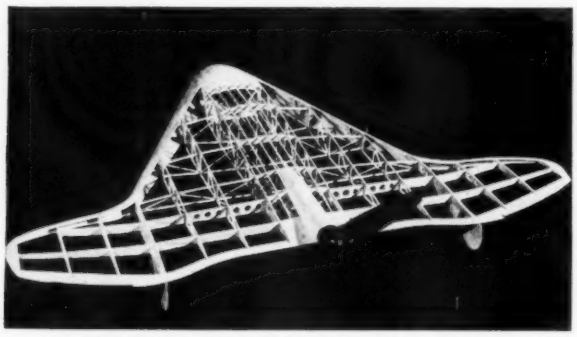


No. 8—Friend of Bengt Lindquist with prize winning Korda model

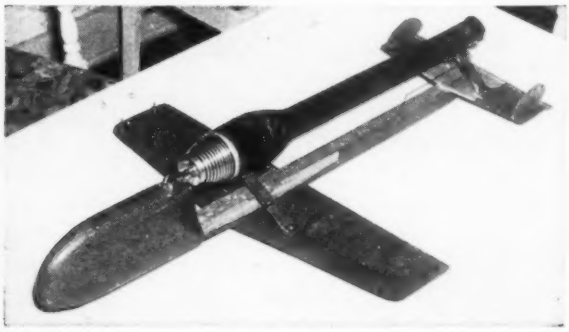


No. 9—Very attractive semi-scale U-liner, a design of Joe Wells

No. 10—Hold your hat, here we go! Two young Smith pilots



No. 11—Ray Piziali did a beautiful job on this Cross flyingwing



No. 12—J. Shafers' second try at jet modeling, a howling success!

F.C.C. that restrictions should be relaxed!

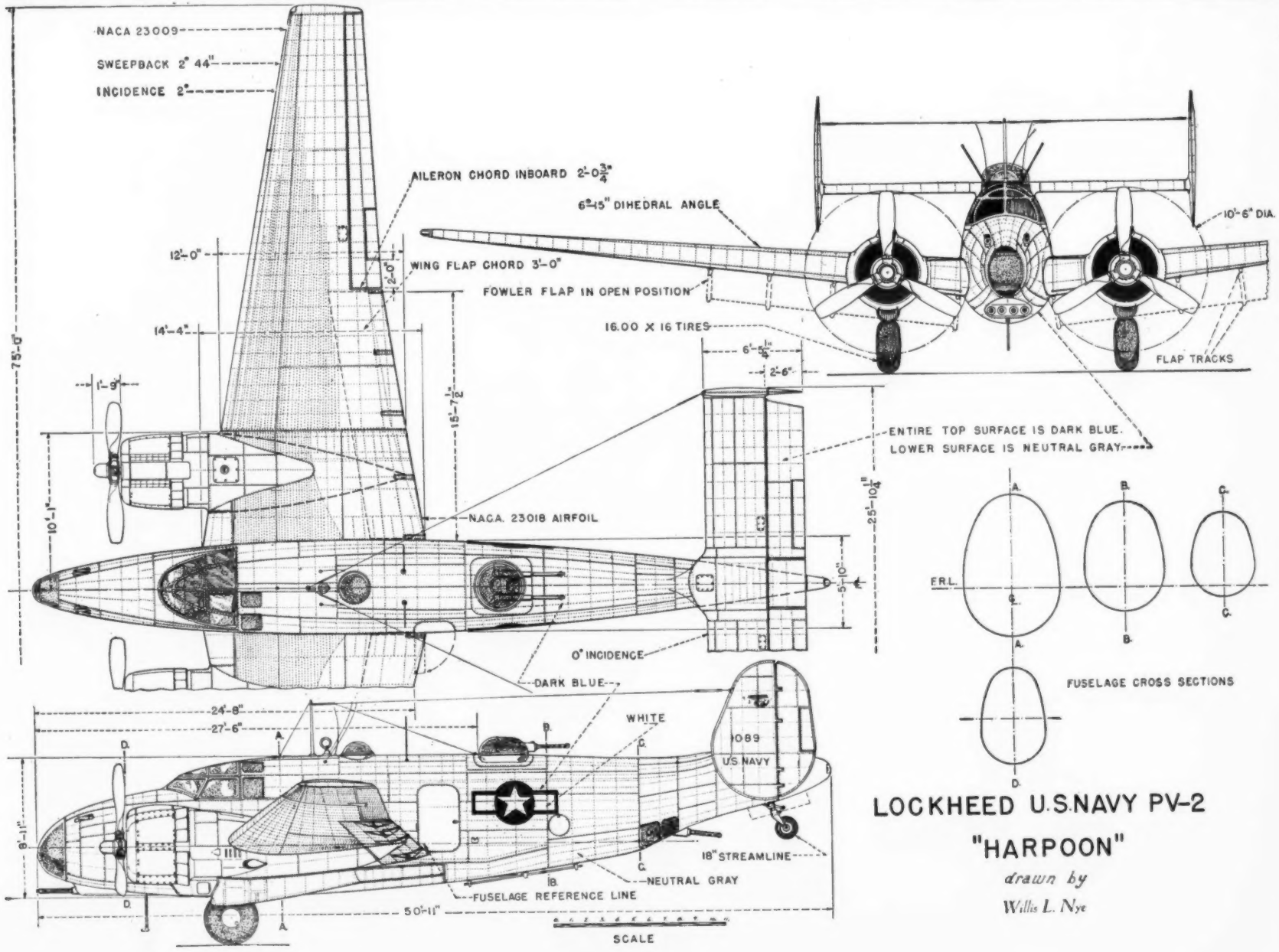
We hear that many modelers are testing and flying R.C. ships without licenses. Why must the future of R.C. modeling be jeopardized just because a few lazy individuals won't make the effort to secure an amateur license—and because some licensed fliers don't study the rules and operate according to them?!

As we go to press, word comes that F.C.C. has authorized manufacturers, after proper application, to undertake development of R.C. equipment that will later be sold for general use around 27 mc. Purchasers of such equipment will not be required to take any examination but will simply have to register the transmitter with F.C.C. Until such an arrangement is announced, let's watch our step, and *help* the AMA Radio Control Committee in its dealings with F.C.C., not hinder it!

AN EXPERT SPEAKS! An active modeler of many years standing, R. L. Clough, Jr. (Bristol, N.H.) takes a sour view of present day contest rules. And since contest rules are what a large percentage of all models are based on, we quote from Mr. Clough's letter: "I'm in agreement with Ray Arden that the next way is toward smaller engines. Bill Winter puts it nicely in his reference to present free flight Class D monsters; but to put it candidly I'd say the manufacturers exist for the sport, not vice-versa. Already commercialism is emerging as a too-dominant factor; with so much pre-fab is it any wonder there are less and less new builders who can, for example, whip up a batch of film or do a good jap tissue job? Now, if *I* were president, I'd go right through the rule book and screw down the regulations so tight that half the ships at next year's contests wouldn't get off the ground; and believe me the ground is where they'd start.

"Everybody tells me the rules are to encourage builders. I can't see it. I can build something around a glow-plugged *Fox*, stand it on its tail for 15 seconds and if it doesn't go out of sight be very surprised. But the satisfaction of such an undertaking is dubious, the contribution to aerodynamics microscopic, and the sporting element extremely absent. If we want all-important progress (and incidentally simplification), I'd say let's up the weight, cut the area, lower maximum speeds, combine all classes under a weight-displacement formula, and permit autogiros, ornithopters, helicopters or what have you, to compete on equal footing in the same events. In that way the dross would sift itself out, contests would take on variety in color and lose that present whine-smash atmosphere which

(*Turn to page* 45)



LOCKHEED U.S.NAVY PV-2
"HARPOON"

drawn by
Willis L. Nye

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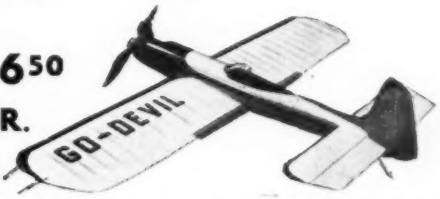

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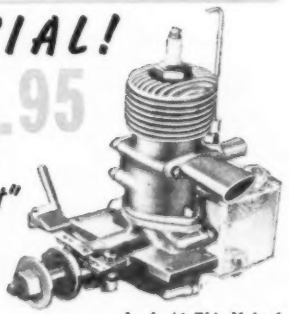

*Sorry, we can't name the manufacturer, but it's one of the outstanding kits offered today.

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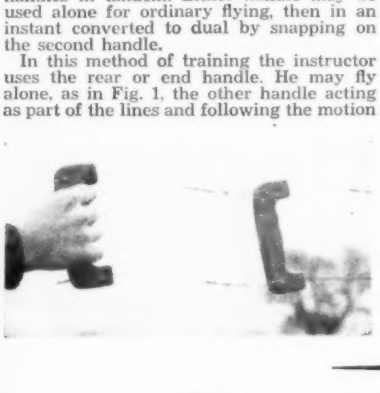
DUAL CONTROL FOR INSTRUCTION

by HERMAN R. LORENCE

THE safest way to learn controline flying is through dual control. In this way the beginner learns in the same manner as in flying a full size airplane. The danger of cracking up a good model is eliminated, and errors may be pointed out by the instructor.

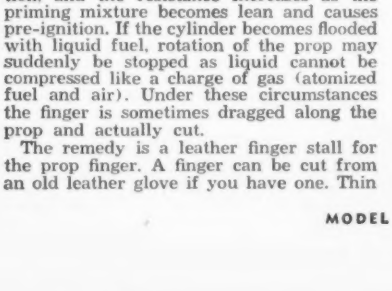
The model used for this training should be a stable one, requiring a definite control motion to cause it to change attitude. It should have sufficient power to fly well, with short takeoff run and a large enough wing to glide in for landings without the necessity of whipping. The model used in the original dual control experiments was powered with a .60 disp. engine and had 288 sq. in. cambered wing.

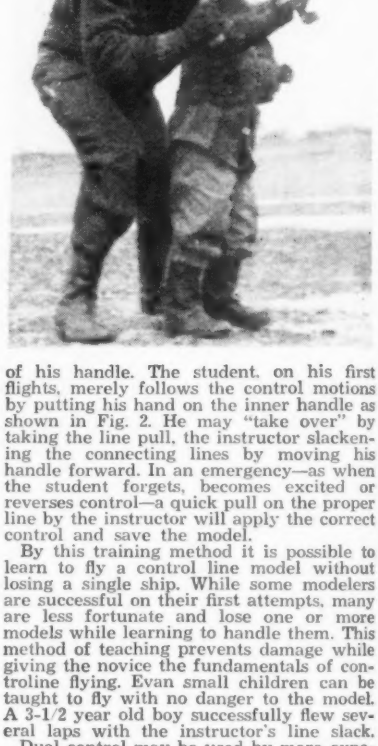
The control handle set-up is shown in Fig. 1. It will be seen that a standard wooden control handle is provided with



loops so that a second control handle may be snapped to it, providing two control handles in tandem. Either handle may be used alone for ordinary flying, then in an instant converted to dual by snapping on the second handle.

In this method of training the instructor uses the rear or end handle. He may fly alone, as in Fig. 1, the other handle acting as part of the lines and following the motion





of his handle. The student, on his first flights, merely follows the control motions by putting his hand on the inner handle as shown in Fig. 2. He may "take over" by taking the line pull, the instructor slackening the connecting lines by moving his handle forward. In an emergency—as when the student forgets, becomes excited or reverses control—a quick pull on the proper line by the instructor will apply the correct control and save the model.

By this training method it is possible to learn to fly a control line model without losing a single ship. While some modelers are successful on their first attempts, many are less fortunate and lose one or more models while learning to handle them. This method of teaching prevents damage while giving the novice the fundamentals of controline flying. Evan small children can be taught to fly with no danger to the model. A 3-1/2 year old boy successfully flew several laps with the instructor's line slack.

Dual control may be used by more experienced fliers for check-outs of new or sensitive ships, or for teaching advanced and stunt flying. It is especially good for this, as it allows the student to learn inverted flying with an experienced flier to save the ship if he forgets that controls are reversed when the ship is inverted.

PROP FINGER PROTECTOR

by RAY RUSHER

ANY modeler who has done much concentrated "prop spinning" has found that his prop finger can get pretty sore, especially if working with CIE (compression ignition engines) or "Diesels." This is particularly true with props which have a sharp trailing edge to get maximum aerodynamic efficiency, the trailing edge being the one that has to be engaged by the prop finger.

CIEs, due to their high compression ratio, offer considerable resistance to prop rotation, and the resistance increases as the priming mixture becomes lean and causes pre-ignition. If the cylinder becomes flooded with liquid fuel, rotation of the prop may suddenly be stopped as liquid cannot be compressed like a charge of gas (atomized fuel and air). Under these circumstances the finger is sometimes dragged along the prop and actually cut.

The remedy is a leather finger stall for the prop finger. A finger can be cut from an old leather glove if you have one. Thin flexible leather such as pigskin is most suitable.

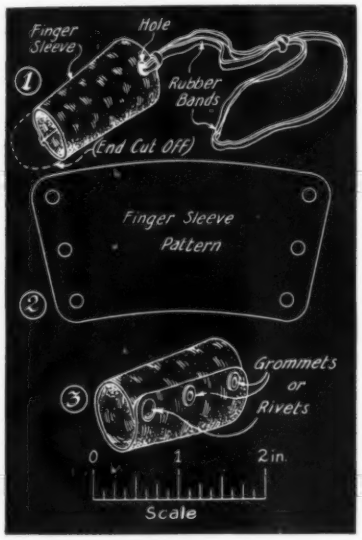
Preferably the end of the finger is cut

off as in drawing 1 to permit the resulting "finger sleeve" to be pulled up tight on the finger due to its taper. Otherwise the finger sleeve may be thrown off the finger when jerking it away from the prop. Another method to keep the finger sleeve on is to loop a couple of rubberbands together as shown, with one through a hole in the finger sleeve and the other around the wrist.

If you don't have a leather glove you care to cut up, use a piece of leather cut to the pattern shown in 2 and rivet the ends together as in 3. Cut the pattern from paper first and see if it fits your prop finger. Average size is shown but you may have to make yours smaller or larger.

The rivets may be the harness maker's variety (copper) or paper fastening grommets if you have the proper tools for installing grommets. Grommets also provide a reinforced hole at the large end of the finger sleeve to receive a rubberband.

Instead of rivets or grommets, the ends of the pattern may be sewed together with a leather thong, heavy linen or shoemaker's thread. You "Dieselers" will find this prop finger protector a valuable addition to your bench and field kits.



Trans-Atlantic Gassie!

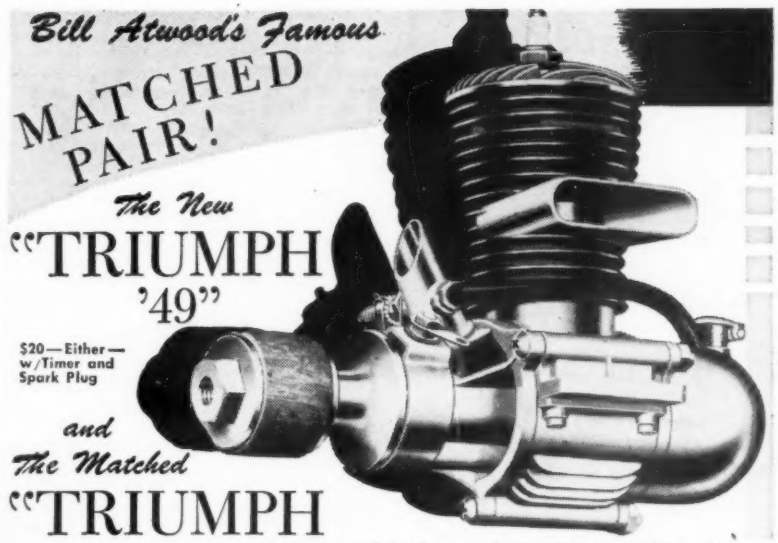
(*Continued from page* 15)

Area	20 sq. ft.
Wing Loading (takeoff)	1.25 lbs. per sq. ft.
Power Loading (takeoff)	38.5 lbs. per hp
Power Available (takeoff)	.65 hp
Engine Brake Hp.	1.00 hp
Propeller Efficiency	65% (direct drive)
Specific fuel consumption (ave.)	1.1 lbs./B.HP/Hr.
Cruise Hp. (ave.)	.40 at 10,000 rpm.
Cruise Hp. Available	.26 (.40x65%)
Fuel Consumption	.44 lbs. per hour

MODEL PERFORMANCE

Cruising speed (ave.)	30 mph
Engine run with 16.7 lbs. of fuel	38 hours
Maximum range (still air)	1140 miles
Max. range—30 mph tailwind	2280 miles

Directional control is necessary to keep the model on an easterly course during a trans-Atlantic flight. With no control the model would fly in large fuel-consuming circles making no progress except that supplied by wind drift. A type of control which might be used ties in the rudder trim tab, with a magnetic compass, and any deviation from the compass course actuates the tab to bring the model back into the proper heading. This magnetic



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type of directional control has been used by European model builders in their ridge-soaring sailplanes. The air loads on the tab can be kept small. The surfaces can be balanced aerodynamically and the only loads to overcome would be in the linkage and in friction.

Hitting Ireland on the nose after a 1900 mile flight from Newfoundland would be a minor miracle with this crude type of control. The problem of staying on course is complicated by the wind. During the last war the Japs released about 9000 small bomb-carrying balloons, relying on the prevailing winds to carry them to this country. Several hundred were actually found as far as 6300 miles away. The winds over the Pacific were fairly unreliable as to direction and the balloons were picked up over a wide area from Alaska to Mexico. The winds over the Atlantic are no better. If a trans-Atlantic model has sufficient range it may hit the continent somewhere between Norway and Spain.

Another control would probably be necessary to limit the model's altitude. Engine mixture settings made for sea level operation would be undesirable at any altitude. Engine power falls off rather seriously. A bellows-type altimeter tied in with the elevator tab would limit the ceiling to about 1000 feet. The model would be initially trimmed for horizontal flight as closely as possible. However, as the fuel load decreased it would tend to climb. The altitude-sensitive bellows would actuate the trim tab as the model approached its ceiling.

Since full engine power is required for takeoff, an engine control should be incorporated to reduce the throttle to a more economical setting when full power is no longer necessary to stay airborne. This could be a control actuated by the decreased fuel level in the tanks.

In the general design of a trans-Atlantic model it may be profitable to jettison any parts when they were no longer needed. For example, instead of a single engine use two engines in tandem. One of these would be dropped overboard at some point of the flight when its power was no longer required. Two engines at reduced throttle might give better fuel economy during the early portion of the flight. Spring loaded pins securing the engine could be triggered when the fuel level drops and the excess engine drops into the Atlantic. Fuel tanks could be carried externally and jettisoned as they are emptied. This would reduce the built-in drag of a wing or fuselage since the thickness could be decreased from that necessary to house all the fuel internally. As the fuel load decreases during the flight the model no longer requires the large wing area. To decrease the drag and improve the model's speed, outer wing panels could be jettisoned, reducing the wing area.

The range of a model is dependent on its fuel load. Every ounce of model structure can be eliminated and replaced with fuel means an increase in range. The propeller is probably an exception to this. Additional weight in the shape of reduction gears would be a good investment. 65% efficiency assumed in estimating performance is discouragingly low. Gears could be used to reduce the propeller rpm and so increasse its diameter and efficiency, while engine rpm would remain at its optimum value. If propeller efficiency could be boosted to 80%, a ½ lb. gear box would pay for itself many times over.

The prospects of actually flying a long distance model on a 1900 mile trip are rather dim. If you launched trans-Atlantic models from Newfoundland in great quantities you would probably be a poorer and older man before you ever got proof of a successful flight. If the very first one was a success, you would probably never hear about it. It would most likely roost unseen in a tree in a remote section of Ireland. All trans-Atlantic models would have to carry instructions to the finder written in a half-dozen different languages since the landing spot would be so unpredictable.

Following a model on an overland flight would be easier. The Philadelphia boys tried some distance flying back in the early days of the gas model. Maxwell Bassett installed a large family-size gas tank in his model and sent it on its way. Victor Fritz followed it in his airplane. No directional control was used and the model circled itself silly, but even so it landed 150 miles away. Even more recently some of the California boys tried the same sort of maneuver, but on a limited scale compared to this proposed 1,900 mile flight. A trans-continental flight across the USA would probably encounter some objection from the CAA. A free flight gas model tooting across the country uncontrolled would be a hazard to flying, especially at night.

If a trans-continental model was possible, the design might be developed to take advantage of the thermals encountered enroute. If you've forgotten how rowdy a good strong current can be, look at the man-carrying glider records: duration over 50 hours, distance 500 miles, altitude almost 27,000 feet. Of course these are man-carrying and the pilot is very current-conscious. A model would require a thermal-sensitive engine control. With the model in the throes of a real current, the engine would throttle back and save fuel until the model had dropped out of the current and was back to its cruising altitude. A really strong current would probably take the model to an altitude where the engine would conk out entirely—leaving you with the problem of starting the engine and resuming normal flight, after the model was out of the current.

A trans-Atlantic model will remain a "paper" airplane for a long time. But in considering this preliminary data on long distance flying, the fact was brought out clearly again—given the chance, the free flight gas model is capable of great things. When you limit the engine run to 20 seconds you haven't even touched the model's potential performance. Give it a big slug of fuel and half a chance and the crate will clip off some respectable mileage.

Midgets Are Fun

(*Continued from page* 24)

broken prop!

The elimination of the old Class I (up to .10 cu. in. displacement) was a disappointment to me, but because of all their advantages I intend to go right on building models of this category. It is my hope that enough modelers will demand the return of this class so that the A.M.A. will have to reinstate it. If not—well, they're loads of fun anyway.

Just try one or two. You certainly stand to gain much more than you can lose! If you follow the suggestions presented in this article you will be assured of a successful model. Certainly the advantages of the little jobs warrant at least a trial. Here's to more and better half-pint models, because midgets *are* fun!

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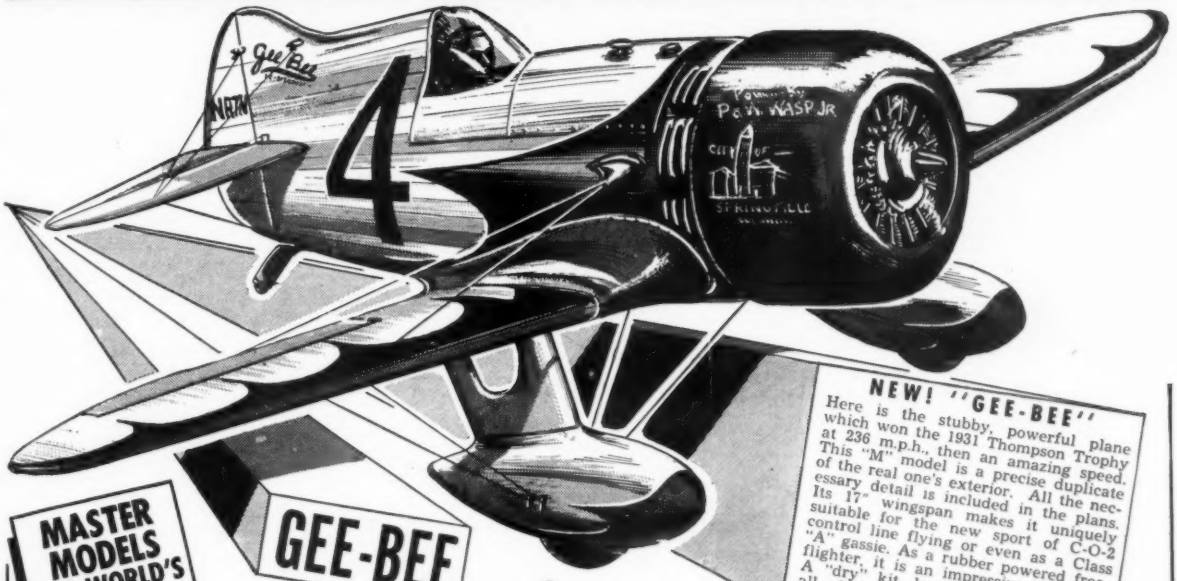

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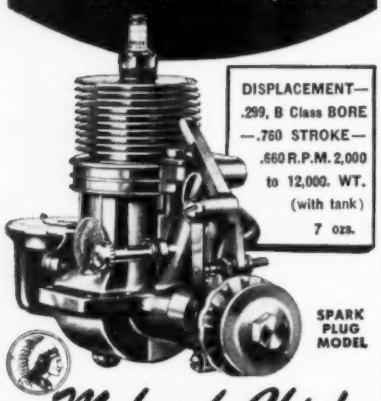

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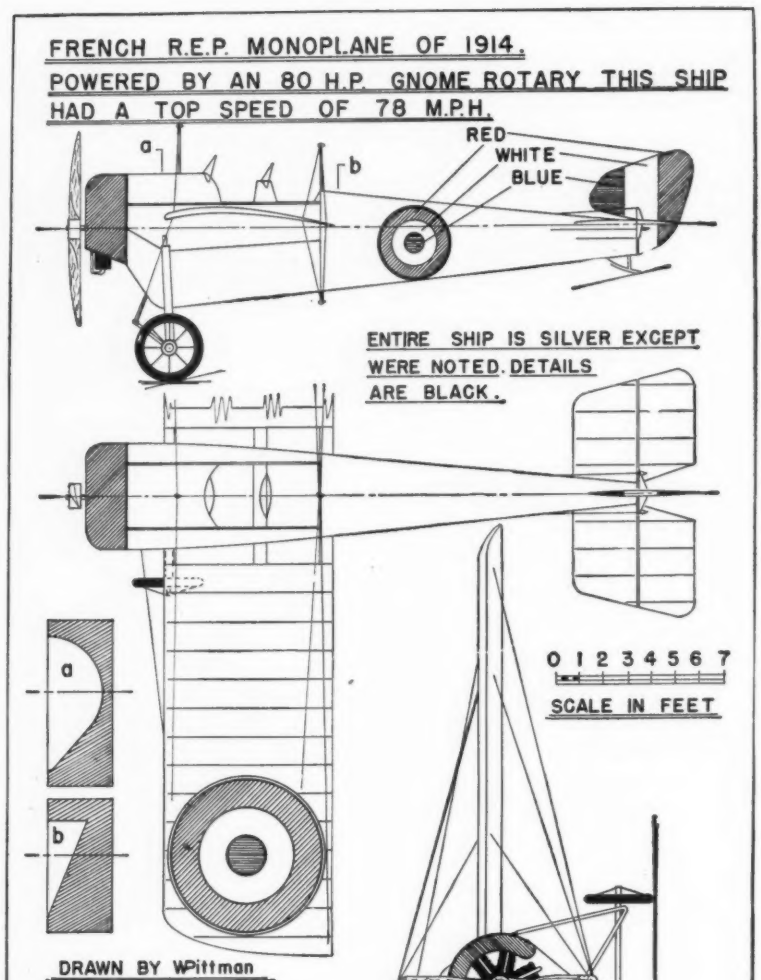
FRENCH R.E.P. MONOPLANE OF 1914.
POWERED BY AN 80 H.P. GNOME ROTARY THIS SHIP HAD A TOP SPEED OF 78 M.P.H.
a
b
RED
WHITE
BLUE
ENTIRE SHIP IS SILVER EXCEPT WERE NOTED. DETAILS ARE BLACK.
a
b
0 1 2 3 4 5 6 7
SCALE IN FEET
DRAWN BY WPittman

World War I

(*Continued from page* 13)

The upper wing was held off the fuselage by four all-wood struts anchored to the upper longerons. The lower plane was bolted to fittings on the lower longerons. Interplane bracing consisted of single stranded landing wires and double flying wires. A single stranded drag wire was provided from the lower wing to the engine mount.

Three stamped steel strap hinges were used to attach the ailerons to the lower wing. These members were controlled by cables and horizontal bellcranks concealed within the lower wing. Both upper and lower wings were cut away near the cockpit to increase visibility.

The 28's wing fabric was tacked to the leading edges, stitched to each rib and to the trailing edges. In addition, pinked tape was generously used over all seams and stitch areas. In spite of these precautions, too much speed pulled the fabric away from the structure. Ironically, it was discovered after the Nieuport 28 had been retired that by moving the wing cover stitch line on the lower surface of each plane about six inches back from the leading edge, the 28's fabric-shedding habit could be done away with. Apparently the cause of fabric failure was a peculiar flow of air around the sharp leading edge, which occurred at high speeds. Without accurate tunnel and laboratory tests such faults were not discernable in 1917-1918; without parachutes, many pilots gave their lives because of such faults and were thus unable to report what they witnessed.

The 28's fuselage was almost an aerodynamic oddity in its day. Long (20 ft. 5 in. overall), it was round almost its entire length, tapering from the engine cowl to a vertical knife edge in the rear. Main structure was a box-like affair of very small crossection built up of four spruce longerons, innumerable uprights and crosspieces, the whole braced with steel wire. Built around this basic frame was a series of rounded bulkheads to which stringers were tacked and taped, giving the fuselage its shape. Bulkheads, or formers, were cut from 3/16 in. three-ply with lightening holes where possible. Stringers were thin rectangular sectioned strips of spruce. The fuselage was fabric covered aft of the cockpit.

From the rear of the cockpit forward to the engine firewall the fuselage was plywood covered, except for sheet aluminum access doors. In this section the fuselage was perfectly round and heavily constructed. The cockpit itself was small, with a very small opening in the coaming,

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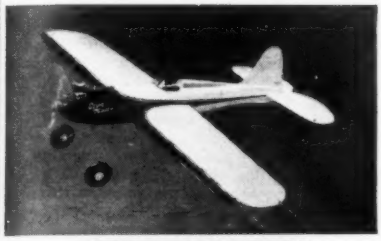

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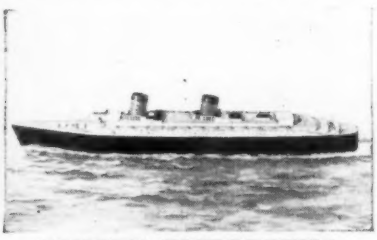

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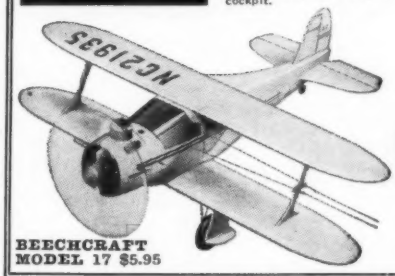

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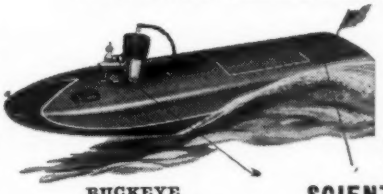

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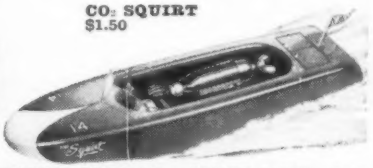

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just enough to admit a man's body. The pilot was protected by a small flat windshield, which proved very ineffective. Almost every Nieuport 28 pilot had his mechanics replace the standard windscreen with a homemade one in order to provide better protection in flight. The 28 was a cold airplane to fly—its pilot, if he were even of average height, had his shoulders and head well above the cockpit rim if he sat upright. The small plywood "headrest" struck most pilots at about the base of the neck.

The engine section of the 28 was simplicity exemplified. The Gnome Monosoupape 9N engine was hung on a stamped steel mount which was in turn bolted to fittings which projected through the firewall. The lower part of the engine section cowl immediately forward of the firewall was left uncovered to expel exhaust gases and raw fuel which might collect in the cowl. The front landing gear strut fittings also were located in this opening.

An unusually small circular opening in its face to permit entry of cooling air characterized the forward engine cowling. Generous cutout vents in the cowl's crown not only assisted in cooling but provided air to expel exhaust gases.

Armament on the 28, consisting of two Vickers synchronized machine guns, was peculiarly placed. The "top" gun was mounted to the left of the fuselage centerline outside the coaming and just in front of the pilot. The second gun was built on a shelf on the side of the fuselage just above the thrust line. Both guns were easily accessible to the pilot in flight.

The tail assembly was a continuation of the graceful lines of the Nieuport 28 in configuration. The horizontal stabilizer was bolted to the upper longerons and was adjustable for trim on the ground only. It was braced to the rudder post by a wire stay above and a small streamlined steel tube strut below. Empennage structure was conventional wood and metal.

Landing gear struts were steel tubes streamlined with wood and taped. A split axle running between tubular spreader bars and rubber shock cord comprised this conventional undercarriage. The ash tail skid was equipped with a hardened steel shoe sprung on shock cord.

IMPROVED MODEL — An improved model Nieuport 28 was brought out early in 1918 and was purported to have been produced without the fabric-shedding characteristic. Few details are known about this model, but we do know from French records that it was powered by a Le Rhone 9R rotary engine which delivered 170 hp at 1400 rpm. This model was rated at 125 mph at 6500 ft., climbed to that altitude in 4 min. 30 sec., reached its ceiling at 20,700 ft. and possessed an air endurance of 2 hrs. 15 min. It was equipped with only one gun and weighed 1390 lbs. loaded. Dimensionally the plane was the same as the original 28 production model but had no dihedral in the upper wing.

This model probably never reached combat except on an experimental basis. It was just too late, and too little of an improvement over the "most beautiful" W. W. I plane, which was also one of shortest-lived pursuits in terms of service.

The American pilots made a good showing with it, but like so many other planes passed up by time and improvement the Nieuport 28 wound up its war career in French training schools.

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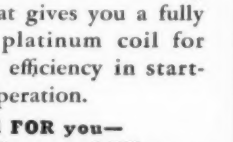

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Supersonic Slim

(Continued from page 27)

fuselage sides. Cement the fuselage top in place on the tops of bulkheads 3 and 4. Before gluing the remaining bulkheads in position note that the fuselage sides do not make a smooth bend toward the rear but are cracked at bulkhead 5 station. This is done by pressing down on the wood with a sharp edged rule or knife. The wood is not cut through or even broken. Having cracked the two sides, draw them together at the rear and glue bulkhead 8 in place. Pull the nose together with a rubberband and glue bulkhead 1 in position. Back up this bulkhead with pieces of 1/8" x 1/4" strip which are glued to the sides and top and bottom of fuselage as shown in the detail.

The fuselage top can now be glued to tops of the bulkheads. Details for the rear-rubber dowel (3/16") mounting are shown on the plan. Having provided for this dowel, glue the bottom fuselage piece onto bulkheads 3 and 4. Small notches may have to be cut to get by the landing gear. Finally, bend the bottom piece into place and cement it along the edges formed with the side pieces. The rear bottom of the fuselage is a piece of 1/16" sheet with grain running across the fuselage (see detail on plan).

The stabilizer and rudder are cut to shape from 1/16" sheet. It will be necessary to use three separate pieces of wood for the big rudder and fin. Before gluing the tail surfaces in place, mix a half teaspoonful of castor oil with 4 oz. of clear dope and coat the sheet. Follow up with a sanding, then three more coats with sandings in between. The dope fills the pores, and the action of the castor oil stops the dope from warping and hardening the wood. The fin is supported at the joint with the stabilizer by two pieces of 3/32" square balsa. Note how the detail shows one piece glued to each side of the fin and to the stab.

To start the wing, cut out the four sheet-balsa panels, the tip sections and the wing ribs. The 1/16" panels are placed flat on the bench and the ribs are glued in place. When dry, remove the pins, then glue the trailing edge of the top panels in place. After the glue has set this sheet is bent down over the ribs. You will have to work fast with the glue. Use a long pointed glue stick to swab cement on the top edges of the ribs before working the sheet covering into position. Be sure the sheet is in good contact with the ribs. This can be assured by pressing down on the middle of the sheet before pinning down the leading edge joint. Be careful not to make two right-hand, or two lefthand panels.

The tops of the wingtips are a trifle awkward since the balsa has to be glued evenly and firmly all the way around the tip. This is detailed on the plans. For dihedral, use your sandpaper block to bevel the inner surfaces of each panel so that, when butted firmly together, the panels automatically have the proper dihedral. Rub cement over the butt ends of the panels and allow to dry. Follow up with an other coat of cement and press the panels together to make a one piece wing. Use pins to hold the work together temporarily and place small blocks under each panel to support it at the proper dihedral angle until the glue dries well. Rub successive layers of cement over and under this centersection joint.

The nose block measures 1-1/4" x 1-1/2" x 3/4". Be sure the grain runs fore and aft to give firm support to the nose bearing. A piece of 1/8" thick sheet is glued to the rear face of the nose block to fit into the nose opening.

The prop is carved from a medium-hard balsa block measuring 10" x 1-1/2" x 1". The shaft is 1/16" music wire. Note the detail of the nose bearing and free-wheeling device. Be sure to glue a 1/4" washer to the rear face of the prop hub, and to place several loose washers between prop and nose block.

Before assembling, add the last minute touches to the fuselage. The bubble canopy is a soft block of balsa carved to shape. The big airscoops which are glued to the sides of the fuselage are made from 1/16" sheet fronts and 1/32" sheet coverings. These are made separate from the airplane and are glued in position when done. Wheels are hardwood of about 1-3/4" to 2" in diam. The ends of the landing gear wire can be bent upward to keep the wheels from sliding off, or small washers may be soldered to the tips of the wire, gas model fashion. The wing mount pieces are cut from 1/8" x 1/4" balsa strip.

Power is 14 strands of 1/8" rubber. Measure out the motor to the same length as the distance between hooks. Bind each end of the motor close to the hooks to prevent loose strands. After the rubber is looped over the prop-shaft hook, close the hook to keep the rubber in place. After a few flights the rubber will stretch a number of inches but this doesn't matter. No tensioner is used, although a tensioner would increase the rubber length considerably—and probably lose the model on its first fully wound power flight. It is advisable to wash off the fresh rubber before using. A "lube" of equal parts green soap and glycerine (obtainable from the drug store) is rubbed onto the strands. Before flying the model, the motor should be prewound. This is done by stretching it out and putting in 50% of the possible maximum turns (1,000 total) then letting the prop run out without launching the ship. Repeat the process using 75% of the maximum turns.

Before flying, something should be said about the various adjustments tried on the many flights made with this ship. Almost all these flights, incidentally, were made at close to maximum power.

General characteristics result in a pronounced tendency for the model to fly straight. The ship can be flown straight upwind, downwind, and even crosswind, off to either side, provided minor adjustments are used when required.

The combination of sweepback, large rudder, and long moment arm has a strong resistance to turning flight. With about 3/32" downthrust, and the same amount of left thrust, *'Slim* will describe a beautiful rolling turn of 180° after a hand launched start and settle down on a long straight climb. The glide should be adjusted by means of the rudder tab

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(very slight movement) to turn to the right. As power runs down the ship will go into a right turn toward the end of the flight and begin a fast power-gliding descent. Perhaps halfway to the ground the prop will free wheel. The small amount of wing area used, plus the large sweepback, does not permit a good glide, but glide was purposely sacrificed for spectacular power performance.

Before attempting a power flight of this kind begin by hand gliding the model to establish the wing position. A firm launch is necessary; be sure you have gliding speed. Our ship flew perfectly with the wings mounted in the position on the plans. Some incidence was added but this is incorporated in the plan. By use of the rudder tab, obtain a slight tendency for the model to turn right in the glide. For the first power flight try 100 turns on the winder—on a 4-1/2 to 1 ratio winder this is 450 turns on the motor. Hand launch—but don't throw—with a firm but even push, for that wing loading is high! If the ship tends to stall under power, add a silver of wood behind the top of the nose block for downthrust, or one thickness of paper from the cover of a book of matches.

The ship should fly straight ahead on an extended power glide or, perhaps fly at a constant low altitude across the field. If it turns right under power, make no compensating adjustment because an increased number of turns will tend to straighten out the flight or even make the ship turn left under power. Increase the number of turns by 25 on the winder with each flight, adding downthrust to compensate for power stalls or mushing tendencies. If the ship refuses to go left immediately after the hand launching when a good amount of power is used, begin to add left thrust by placing shims behind the right side of the nose block. The trick is to build up to full power, gradually adjusting by means of left offset and downthrust as you go. If in the gliding turn the model tends to stall or mush, slide the wing back a trifle. If it gets too tight, remove some of the right rudder. But if either of these changes are made while adjusting do not add more power until the effects have been observed with another flight on the same number of turns.

With these adjustments, *'Slim* was flown back and forth, hours on end, across three farms. Its pattern of left turn on the launch, followed by a long straight flight, then a right glide, repeated as regularly as clockwork flight after flight.

Some flights were made on a combination of left rudder and neutral thrust, with a very high power flight overhead, straightening out belatedly into the same straightaway cross country. It may be necessary to use a trifle of right thrust with this adjustment to guard against power spins to the left. But a trifle left rudder on the original ship with no right thrust worked very well. A combination of right rudder, for right glide, and neutral thrust produced a partial turn to the left under power, going into a very high right climbing turn, then the inevitable trip as the crow flies. *Supersonic Slim*, while ideal for anyone who wants to fly for fun, is a sturdy docile guinea pig for trying out your pet adjustments. Just remember that it is designed for power performance and straight fast flying. A winder should always be used with a minimum of 550-600 turns for decent flying. A maximum of 900-1000 turns can be used but this is very hard on the rubber.

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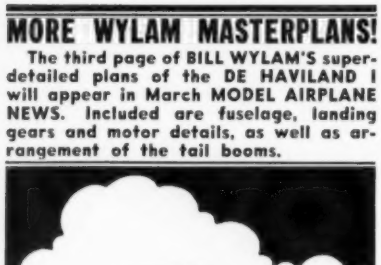
The third page of BILL WYLAM'S super-detailed plans of the DE HAVILAND I will appear in March MODEL AIRPLANE NEWS. Included are fuselage, landing gears and motor details, as well as arrangement of the tail booms.



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(*Continued from page 21*)

command: "Flash your weapon!" and the fighter turns on its Aircraft Interception set, the long range 'scope of which is located in the rear cockpit. The radar operator then directs the pilot to turn and twist the fighter until the enemy aircraft is within short range, at which point the pilot's own radar 'scope is flashed on for closeup detection. At this point the aircraft ahead is interrogated by an IFF (Identity Friend or Foe) unit, and if the proper identification is not made, then the distance is closed to machine gun (125-150 yds.) or cannon (250-300 yds.) range and the fighter armament cut loose.

From the foregoing description, some of the equipment that must be carried by the modern "all weather" fighter is apparent. To receive the "vector" signals (as well as any type of instruction) from the ground, the fighter must carry a Liaison set, a transmitter and receiver. To cooperate with other aircraft in the formation, a Command Set, and perhaps several transmitters and receivers are required. Aircraft Interception equipment, the main radar unit, is used to detect and range enemy aircraft. IFF equipment must be carried, both to interrogate unidentified aircraft and to provide proper identification to friendly aircraft. A Tail Warning radar unit may be used to discover enemy aircraft approaching from the rear where the main Aircraft Interception equipment cannot detect due to the presence of the fuselage. In addition, such radar and radio equipment as Radar Altimeter, Marker Beacon Receiver, Loran navigational equipment, Glide Path Receiver and Radio Compass equipment may be included. Obviously, the modern "all weather" fighter is a flying electronics laboratory. To energize all of this equipment requires a tremendous amount of electrical power, the Aircraft Interception unit alone demanding from 500 to 1000 watts of power. It is not unusual for the modern combat aircraft to have generating capacity of 15-30,000 watts power, the equivalent of a good size commercial broadcasting station.

But possessing all this electronics equipment is not enough. To close the range to the enemy quickly demands great speed and climbing ability of the "all weather" fighter. To attain the altitude of attacking enemy bombers demands of the fighter an exceptionally high ceiling. And to enable it to remain aloft long enough to chase, catch, destroy enemy aircraft and return safely to base, the "all weather" fighter must possess an adequate fuel capacity to provide the range needed.

To provide comfort for the crew at high altitude, the craft must have a pressurized cabin—one that is heated and cooled to the requirements of the occupants. The cabin canopy must be instantly jettisonable for quick escape and the crew members equipment must include ejection seats. Oxygen equipment must be carried as well as emergency equipment for descent at sea or over barren land.

And so it is with a greater appreciation of the almost unbelievable amount of equipment that is contained inside that we view the trim, speedy lines of the XF-89 "all weather" fighter. Try as he might, however, the aircraft designer cannot perform miracles and the XF-89 is a really big airplane. Its wing stretches about 50 ft. from tip-to-tip, and its fuselage is a similar distance from nose-to-tail. But simple dimensions do not tell the story, for the new plane actually weighs more than 15 tons fully loaded. This is actually more than *twice* as heavy as the 16 place Ford Tri-motor airliner of the early 'thirties!

It has become increasingly clear that you can always count on Northrop engineers to come up with a surprise, and the new XF-89 is certainly no exception. First surprise is the conventional layout of the airplane: straight wings, smoothly tapered fuselage and a conventional tail surface grouping, but engineers are rapidly learning that high speed demands low drag and that means *simplicity!* Really novel, however, is the location of the two Allison J-35 turbojet engines which are mounted not quite "in" but not quite "out" of the fuselage. Northrop engineers simply proceeded in a logical manner: (1) all of the required electronic, armament and crew equipment was located in a smooth fuselage; (2) the thin, high speed, laminar-flow wing was laid out completely uninterrupted by air intakes or other paraphernalia right up to the fuselage to reduce wing-fuselage interference to a minimum; and (3) the engines were located in the only remaining available region: the fuselage belly. Of course, they could have been mounted side-by-side within the belly (as in the McDonnell XF-88 *Voodoo*). However, to preserve the solid nose for radar and the clean wing for low drag, two air intakes are required and these engineers reasoned that since large air inlets would protrude into the airstream anyway, then the engines might as well be located directly behind them to prevent any sudden changes in fuselage crossection, which always increases drag.

Using the very latest available research information, the XF-89 engineers have advanced a definite step forward in the design of the empennage. First of all it is located high to get it out of the wing wake and the jet engine efflux, thereby preserving its effectiveness up to high angles of attack (such as during landing) where it is needed most. It has a high aspect ratio (span divided by chord), which wind tunnel tests have proved far more efficient than short, blunt surfaces. But one of the problems revealed by such "cruciform" tail designs is the double-expansion of the air at the point where the vertical and horizontal leading edges meet. When the air hits the stabilizer it splits and flows over and under the surface. When it hits the fin it splits and

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flows left and right over the surfaces. Now, at the exact point where these two surfaces meet at the leading edge, the air has to flow up-and-down plus left-and-right at the same time, resulting in large losses in efficiency. Northrop engineers solved this problem by placing the stabilizer leading edge well out in front of the fin leading edge so that the air first splits up-and-down and then, some time later, makes the expansion around the fin in a left-and-right split. This simple device greatly reduces the drag of the joint and also increases the effectiveness of the control surfaces by delaying the stall. (It is interesting to note that the British solve this problem on the DeHavilland *Vampire* jet fighter by a large streamlined "bullet" completely enclosing the leading edge confluence, thus causing the air to flow smoothly around the joint in an infinity of paths.)

The extremely thin wing of the XF-89 presents a difficult problem in the stowage of landing gear in the retracted position. The ability of an airplane to operate from soft fields or weak runways depends on the "foot-print" area of the tires and heavy bombers use very large "balloon" tires, often in double or quadruple mounts to reduce the amount of weight carried per sq. in. of tire area. But thin wings are certainly not conducive to the stowage of such giant tires, so Northrop was forced to compromise the ability of the XF-89 to operate from a variety of surfaces in favor of highspeed and therefore designed an extremely thin tire-and-wheel to permit its complete retraction into the wing. The full cantilever main gear struts fold inboard and the gear is completely covered in flight.

The nose gear was not such a difficult problem and the underslung belly of the XF-89 permitted the use of just about the shortest nose gear ever used in a military airplane (comparable even to the famed nose wheel of the wartime Convair B-24 *Liberator* bomber). Dual nose wheels are used on the new "all weather" fighter to reduce the ground load as previously described. The nose gear also is completely enclosed by tiny clamshell doors in the retracted position.

The XF-89 came into being in the form of a circular proposal competition in which the Air Force invited all interested manufacturers to submit their conception of the plane meeting the rigid requirements laid down. The Curtiss XF-87 used four engines to do the job and this arrangement seriously affected its range. The McDonnell XF-88 uses sweptwings to provide the high speed required but at some sacrifice in low-speed (such as landing) stability and control. The Northrop XF-89 hit the right combination of range and stability and thus is the blue ribbon winner in the competition so far, although tests are still continuing.

The new aircraft was designed and built in near record breaking time; it made its first flight August 16, 1948 at Muroc Base, Calif. where it had been trucked under heavy canvas from Northrop Field some 60 miles away. At the controls was Northrop veteran test pilot Fred Bretcher who took the trim craft aloft for 40 min. on this initial flight, always a good indication of satisfactory stability and control. The new fighter was immediately started through its punishing Air Force acceptance tests but it has been breaking records with the speed with which it has progressed to date.

The gloss-black "all weather" fighter will never smash any world's records with its 550 mph top speed but it is just as certain that no world speed record holder will ever haul aloft the four tons of equipment mounted in the XF-89. The deadly craft was designed to "seek out and destroy enemy aircraft under periods of restricted visibility" and that is exactly the job it is prepared to do—perhaps better than any other aircraft ever built.

At this writing the future history of the XF-89 cannot be predicted since in the Navy Douglas XF3D-1, the Department of National Defense has a contender for the "all weather" fighter procurement awards. This plane is already in limited production for the Navy, and Air Force versions could be produced cheaply and at a rapid rate. But the XF3D-1 is not equipped to do the job of the XF-89 and if sheer performance and combat capability is the deciding factor in the contest, then the Northrop XF-89 will certainly become the "night fighter supreme" in the Air Force squadrons.

BOOK REVIEW

SERIOUS students of large aircraft, and of models for that matter, will be interested in the latest "Jane's All World's Aircraft", 1948 edition (Macmillan & Co., New York City). Compiled and edited by Leonard Bridgman, this volume describes the aircraft produced in every country on the globe, in most cases accompanied by photos and often by small 3-views. A section is devoted exclusively to aircraft powerplants of every nation. There are also separate departments covering military and civil aircraft facilities, each listed by countries. This large volume (over 600 pages) is truly an encyclopedia of aircraft progress in 1948.

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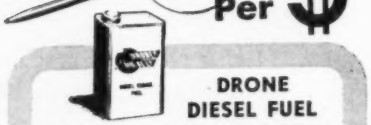

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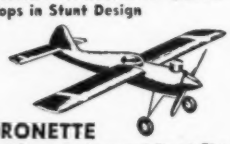

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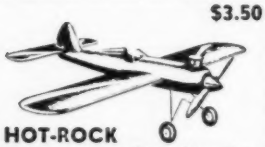

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Scrap Box

(*Continued from page 9*)

the war. Vernon managed to get to the states in a DC-4 and met such widely scattered modelers as Frank and John Zaic, and Pete Andrews in New York; Ed Lidgard and the Chicago proxy fliers (Wakefield), and Dick Korda, in Cleveland, mentioning just a few. Postwar modeling Down Under is marked by the number of oldtimers actively flying again. A friend of Gray's named Pepperell, and son, make a range of Diesels which give the gas engines a bad time. Bores are 5/16", 7/16", 1/2" and 9/16" . . . R. David Matthews wants to know if he can get a clamp-on exhaust pipe for his 11 year old *Brown D Jr.* Anybody have one? Matthews runs his *Brown* on *O & R* pistonring fuel! . . . Boyd Feldstad, Toorak Gardens, South Australia, tells of the first Australian nationals, with entrants from New Zealand and the Australian states. Wakefield, rubber, sailplanes, hand launched gliders, control line stunt and speed. What, no free flight?

"J. C." Yates describes something new in judging at an Army contest, at Davis Monthan Field, Tuscon, Ariz. The judges sat in the center of the circle where they didn't get a distorted view of the maneuvers. The judges tell the next maneuver on the flight pattern, so they have no doubts about what the pilot is trying to do. Worked very well, too.

Want some British black rubber? Or maybe some of those nice British Diesels? Here's how: D. B. Parrington, 41 Lyndhurst Rd., Burnley, Lancaster, England and his group would like to get some engines in the *Pacemaker* (*Pacemaker* preferred) displacement class. Their mills are mostly 2 cc. and under down to the .2 cc *Hawk*. (The Editor says he tried the little ones and they are lots of fun.) Will swap.

* *

Jim Walker is pretty serious about this fence business. We are not referring to the fence to which radio gangsters sell stolen engines but to the cage idea proposed by Walker to prevent accidental injuries to spectators from disobedient control line speed models. Jim disputes the $2,000 price tag mentioned in our last column and suggests that a suitable barrier could be made for about $200. A chicken-wire fence could be erected for something like $90 in Jim's opinion. He is running experiments on the design and mesh of possible fences and recently offered a sizable contribution to California speed fliers to help with similar experiments. His suggestion was that whirled weights with velocities up to 200 mph be used to test the mesh required.

Walker suggests that, on the fence design, strain cables be attached to the top of the poles, the poles being set at a slight outwardly inclined angle. Only a few of the poles would require guys to prevent overbalancing. By using guys, much of the hole digging for posts would be eliminated and the fence would be portable and easily set up in a short time. Since any model that clears the fence would pass over the heads of the crowd, it was suggested that a 10 foot high fence would eliminate most chances of mishap.

It isn't surprising to hear that there is opposition to the fence suggestion. Most arguments are based on the supposition that fences would be more of an obstacle to the use of certain desirable flying sites. Many dislike the cost, whether $2,000 or $200. But it seems to us that the facts of speed-flying life should be faced sometime. So, okay, the ships are too fast and bust loose or throw parts on striking the ground. If the speed boys won't slow them up, either by modifying present designs and methods, or by introducing something more radical like semi-scale, then what choice have they but to use fences? If we are going to chance the risks in the future, with possible harm to all powered flying when some sorehead with influence decides to get rough, then the heck with fences or changes. But if the risks cannot be tolerated, the alternates are simple.

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A new private plane design, the ANDERSON GREENWOOD 14, is a small pusher of considerable interest to model builders. The tail is carried on two simple booms, projecting back from the high wing. This ship, which looks like a good subject for both free flight and controline models, is the big plane feature in March issue of MODEL AIRPLANE NEWS . . . on sale everywhere Feb. 8th!

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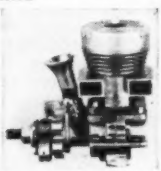

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Either slow down the ships or put up fences. On these grounds, Jim Walker's fence idea must be taken seriously.

* *

On the zany side is this story from H. A. Thomas of Little Rock. "H. A." had heard that his old friend Carl Pfeifer had booted the bucket. Carl, incidentally, hailed from Piggott, Ark. and at least once had crashed the magazines. Thomas felt pretty bad about news of Carl's demise, but he got the shock of his life at Olathe when Carl strolled onto the scene—and with a yarn of his own. (The quarterback gave it to the halfback, there, fellows!). Carl apparently had come to life to build an *Interceptor* for the Nationals. So H. A. asked him what he was doing toting an *American Ace*. "Oh, I tested the *Interceptor* in a pasture. It landed nearby, but before I could get to it the hogs ate it. Everything except the landing gear and engine. Even the coil was gone." Well, men, that hog should get the free subscription for creating the best story of the month! . . . Tall stories this month seem animal conscious, because another hog ate a British free flight and some guy towlined a stuffed hawk. 'Nuff said!

Airways

(*Continued from page* 31)

finds the free flighter alternately praying the dethermalizer will jam and that it won't. The same for control line. Make them use wheels on speed jobs and some smart lad will work out practical retraction; specify a payload and we'll see variable props (Goldberg's idea). Introduce a proto class (some work here already) and let four or five fly from the center of the same circle at once.

"The point is, that nothing evolves in a static environment or in one that is too soft. The present model environment is soft. Nobody is required to think any more, merely to risk models and take chances and buy a new one when you bust it."

These are interesting observations and convictions about the sport of model flying—what are your views?

A POOR EXCHANGE. Model builders in the U.S.A. have found it quite interesting to exchange letters, ideas, magazines and model materials with builders in other countries. Through the medium of our "News of Modelers" column, and other means, this interchange has grown to a surprising degree. It is of course particularly heavy between the U.S.A. and other English-speaking countries, where there are no language difficulties.

In all the cases we have heard of, and our own experience as well, the exchanges have been mutually satisfactory to both parties—particularly considering the difficulties imposed by currency restrictions, monetary differences, and even transportation irregularities. However, we learn of one such exchange which did not turn out so well for one of the two parties involved; and sad to say the overseas modeler, who could ill afford it was the victim.

Briefly, an American modeler requested an English correspondent to send over two new English diesels and offered two used American engines in trade. The deal sounded satisfactory, so the English fellow immediately shipped off the two engines by registered mail. For a long period no word was received from his American "friend." Finally he did receive a package—it contained one very beat-up motor (of a different make than originally agreed upon), plus several other items for which the English modeler has no use. No explanation of the shipment was ever sent.

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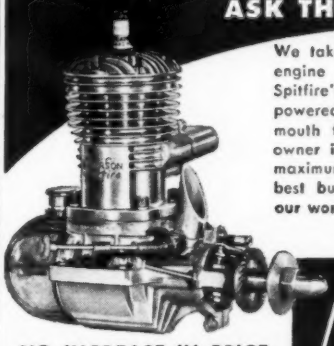

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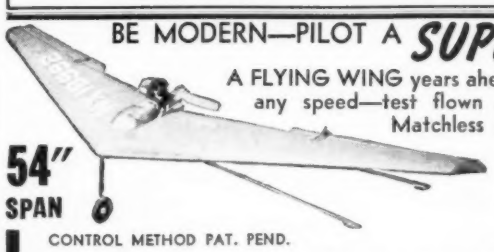

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Fortunately the English fellow has other (and genuine) friends in this country, so he doesn't believe that we all engage in sharp practices.

While it is true that chiselers will horn in on every legitimate activity, their operation in model aviation, we are happy to state, has been held to a minimum; let's all try to keep it that way! But if another such instance should arise, it is suggested that the matter be reported to the model governing board of the offender's country. Also, some nations, including the U.S.A., have strict postal laws forbidding misrepresentation by mail and this may be another means of bringing pressure against the violator of this honor system among modelers.

WE lead off this month with picture No. 1, submitted by R. Sadler (35 Wairbods Ave., Green Lane, Coventry, England). This sleek job is a 1/4"-1' scale model of the *Miles M52*. The original was a supersonic jet plane 90% completed when the British Air Ministry halted production.

No. 2, sent in by Hans Justus Meier (23 Bremen, Kirchweg 33, U. S. Enclave, Germany), shows a model typical of what is now being built in the Western Zones of Germany. This particular ship is powered by a 10 c.c. *Kratmo* engine and was built by one of the Goeppingen Group modelers. Note the butterfly tail and the unusual placement of the ignition batteries. Mr. Meier writes that rubber modeling is not too successful because the only rubber available is prewar stuff which is now pretty old and brittle. Gliders, of course, are one of their principal activities; some motor models are in operation. He tells us that a number of German model groups, in both the U. S. and British Zones, have been issued licenses by the Military Government and members of these clubs are very anxious to correspond with modelers in other countries. Interested parties may contact them through Mr. Meier.

The *Manta* design in No. 3 is a product of Bob and Andrew Thul (1118 Lois Dr., Cincinnati, Ohio). The design is by Artie Gray, and the builders say that since it was their first controliner they had a certain amount of misfortune when it was originally flown. However, the picture was taken after a year of service and a recent overhaul put it back into top contion. Powered by an *Ohlsson 60*, the model flies at about 65 miles an hour, handles very easily, and makes fine landings because of the special shock absorbing gear. Wingspan is 54".

No. 4 comes from Gene Tempelmeyer (5203 Plover, St. Louis, Mo.) and shows a ship he built for the Nationals. Unfortunately it was lost on a test flight just the evening before he left for the big meet. Flown at 5:30 in the afternoon, the model crossed the Mississippi and disappeared out of sight after 13 minutes. It flew a distance of 7 miles and was later found and returned to the owner in time to be taken to the Plymouth Meet at Detroit. There it was again lost, this time on its first flight and was chased for about 45 minutes. It was again recovered after having flown approximately 20 miles. This is a Class D stick model with 200 sq. in. area, 43" span, and driven by a single blade 18" prop using 24 strands of 3/16" flat rubber. Total weight is 9 oz. Gene states he broke the Senior Class C Stick National record with a 150 sq. in. area of the same design.

In No. 5 we see D. Richardson (16A Hastings Rd., Southend-on-Sea, Essex, England) tuning up the motor of his contest model. This snapshot, submitted by Reginald D. Chapman, Sec. of *Southend Modelers Association*, (187 Ambleside Dr., Southend-on-Sea Essex) is a *Bikini* of 60" span, powered by a *Movo* 2 c.c. diesel. Total weight is 13-1/2 oz., and wing loading is 4-1/2 oz. per sq. ft. In still air, with no thermals, the ship turns in consistent flights of about 3 min. on 20 sec. motor runs.

No. 6 shows John C. Porter Jr. (Iris Place, Newport, Tenn.) holding his scale model of the tiny Piper *Skycycle*. Although John doesn't tell us so, we gather from his description that this is a non-flying job on which all controls are workable; the cockpit is completely outfitted, as was the original. This beautiful model, which is painted sky blue and yellow, has won several trophies.

When No. 7 was photographed by Hans Messmer (114 Fifth St., Ridgefield Park, N. J.), the scale model Grumman *Widgeon* had just been completed. Since he would like to make test flights in water, he feels it is better to wait until good weather comes in spring. This accurate scale model has a 50 in. wingspan, retractable landing gear with shock absorbers, and a super paint job in cub yellow and metallic blue. Power is furnished by two *Forster 29* motors. Let us know how the test flights turn out, Hans.

The Swedish modeler in No. 8 is Rune Einarsson (Jakobsdalsgatan 22, Lundsvall, Sweden) and the photo was sent to us by Bengt Lindgvist (L. Jarnvagsgaban 63, Lundsvall). Experienced builders will recognize this as one of Dick Korda's early Wakefield designs. The particular model shown has won several first places in local contests.

Joe Wells (member of the *Thunderbugs Club*, North Long Beach, Calif.) designed and built the very attractive semi-scale controliner shown in No. 9. This realistic and beautifully finished ship is powered by a *Madewell 49* and is painted a metallic maroon with colored numbers. Wayne Denny, who sent the photo and is also a member of the same club, reports the model flies extremely well on 65' lines.

The two young pilots in No. 10 are Billy and Sandra Lea Smith. Papa Smith (Wm. E. Smith, 4026 Blaine St. N. E., Washington, D. C.) writes that they are as deeply interested in models as he is, accompanying him on all his flying expeditions, and "They always insist on helping."

A really outstanding job of construction appears in No. 11. This is the framework of a *Cross* flyingwing built by Ray Piziali (24780 Audrey Lane, Detroit 19, Mich.). Though Mr. Piziali also sent us some fine photographs showing the finished model, we believe readers will get most benefit from a study of this unusual framework shot. The pusher design was worked out by Norman Cross and the model has a span of 33". After only ten flights, the model landed in front of an automobile which was traveling at high speed and was practically atomized. Ray says it was one of the finest free flight models he ever tried because it was usually stable and so good, in fact, that he intends to make another one just like it.

Photo 12 shows the second jet model built by J. O. Shafer (1910 First Ave., Jackson 26, Miss.). This dyna-jet speedster has a hardwood wing, and the nose covers a 5 oz. machine-oil can. It has been flown many times, but it is usually employed only for demonstrations at contests. Although never flown officially for speed, it was clocked at 111 mph.

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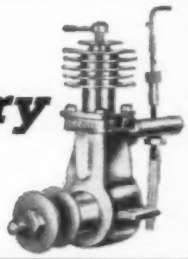

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NEWS OF MODELERS

In this column we publish the names and addresses of readers (most of them from overseas) who write us that they are anxious to contact American modelers. Some seek a pen-pal; others wish to exchange a foreign jet or diesel for an American engine; some would like to exchange magazines, plans, etc. You will find it very interesting to select one or two names and start a correspondence with these fellow modelers.

PEN-PAL SEEKERS: Capt. S. J. Gurn, 8th Royal Tank Regiment, Catterick Camp, Yorks, England . . . D. G. Hall, Claymines, Buchlyvie, Sterlingshire, Scotland . . . Dave G. Hodinott, 50 Mackie St., Ayr, Scotland . . . Ken Townsend, 87 Beadnell Rd., Forest Hill, London, England . . . D. Brashier, 307A Lower Addiscombe Rd., Croydon, Surrey, England.

EXCHANGE MOTORS: J. T. Goulding, Stocks Hill, Castor, Peterborough, Northants, England . . . Ivan F. Mayer, c/o Mrs. G. Gaunt, Sunnyholt Rd., Parklea, Blacktown, Sydney, N. S. Wales, Australia.

EXCHANGE MAGAZINES, PLANS, ETC.: Peter Cartagena, 19 W. 111 St., Apt. 1A, New York 26, N.Y. . . . M. Irwin, R. D. Ngakuru, Rotonia, N. Zealand . . . Roy S. Burton, 110 Colby Dr., Thurmaston, Leicester, England.

SPECIAL REQUESTS: Carl F. Lloyd, 19 Kingsland Ave., Chapelfields, Coventry, England, would like to exchange monthly a copy of the English publication *Aeromodeller* for a copy of *Model Airplane News*. . . . Hugo O. Mosquera V., Colegio Mejia, Quito, Ecuador, S. America, wishes to correspond in Spanish with some American modeler who is also interested in exchanging ideas, materials, etc., principally in the U-control field.

CLUB NEWS

California

Over 80,000 spectators saw the *Air Fair* held last Oct. 10 at Crissy Field, San Francisco. Jack Sumner and Ray Spinelli of *SF Mustangs*, gave the crowd a real thrill with their beautiful precision ships. The Helicopter in flight, however, was considered the most interesting demonstration of the afternoon.

The annual Gilroy "Jaycee" FF contest, held Oct. 17, turned out to be a big success and was well attended. Ocie Randall was Director; Mrs. Randall, Registrar. Results: *Class A*—Joe Bilgri 11:49; *B*—Luther Simonian 7:54; *C-D*—Ronald Mosier 13:43.

Light rain not only limited the number of entries but prevented record breaking performances when the *Thermal Thumber Model Aircraft Club* youth tournament was held Oct. 17 at the *Los Angeles Aeromodelers' Flying Field*. Almost 100 youngsters were competing in two classes for Cal-Aero Technical Institute perpetual trophies. Results: *Jr. Rubber-Powered Cabin*—Arthur Russell 0:31.2; *Jr. Rubber-Powered Stick*—Jimmy Kading 8:24:3; *Sr. Rubber-Powered Cabin* — Charles Primbs 10:05.3; *Sr. Rubber-Powered Stick*—Charles Primbs 10:16.7; *Jr. Sweepstakes*—Jimmy Kading; *Sr. Sweepstakes*—Charles Primbs.

At the Livermore Naval Air Station on Nov. 7, the *East Bay Aeroneers Association* sponsored the California State FF Championships, with Jack Volponi as Director. Don Foote, who did a good job in getting things started in the right direction, unfortunately was in the hospital at the time of the meet. Here are the results: *Class A*—Carl Rambo 6:15; *B*—Fred Morgan 9:43; *C*—Jack Volponi 8:23.2; *D*—Frank Newquist 6:22.

Jack Ritner (who previously won the 22d Annual Recreation Model Aircraft Tournament) won the Class A hand-launched stick contest held by the Pterodactyls on Nov. 13. His superlight little stick model turned in an O.O.S. flight of 2 min. 45.2 sec. on the third attempt. Fred Schulenburg, 11, won the micro division, his first win in this event.

Florida

We're sorry to learn that, in spite of the intensive and unselfish efforts of A.M.A. Leaders Don Warner and M. C. Faulk, the Florida Association of Model Clubs has ceased to exist. We hope this is temporary and that the clubs in this state will get together along the lines of other successful regional groups, in California, Ohio, Midwestern States and the Eastern States.

Illinois

The Gas Model Aeronauts of Chicago meet on the 2nd and 4th Fridays of each month at Gage Park Fieldhouse. New members are invited. For additional information write to: Sec'y Peter Sotich, 3851 W. 62 Pl., Chicago 29.

Another new club has been organized—*Rockford Aero Aces*. Their chief purpose is to build and discuss free flight modeling problems; excellent workshop facilities are at the members' disposal, as well as individual instruction for beginners. To equalize responsibility of club activities among the leading members, a board of directors replaces the customary club offices. The present members are: Howard Heminger, Bob Lawrence, Hugo Anderson, Ken Youngman and Joe Yeazel. Any board member may fill a given

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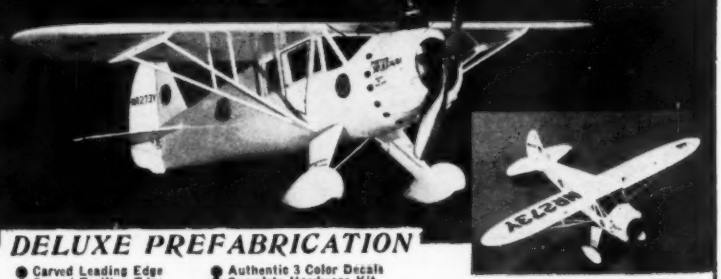

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office in the event of a business meeting. The club dues consist of a "kitty," a "put what you can spare" proposition. Funds taken in by the "kitty" are used to aid the club in purchasing shop equipment, model supplies, assist junior members to contests. A liberal time qualification must be made before acceptance, in order to assure interest and determination for modeling on the part of the applicant; this system assures more permanent membership. Club meetings are held on Friday evenings at 836 Diamond Ct., Rockford.

Iowa

"Our local club was very fortunate this past season," writes Dick Kulaas of the *Skymasters*, "in being able to fly anytime on the Luther College campus in Decorah. One contest was held on their football field, and their lawns and athletic fields were open to us at all times."

Kentucky

The *Louisville A. B. C. Model Club* (the A, B and C are for airplanes, boats and cars) recently completed a race-track with the cooperation of the City. It took nearly a year's effort. The club had been sponsoring 3 controline contests and 1 free flight contest each year, but many of their 65 members thought that wasn't enough. So local hobby shop dealers came to the rescue; they sponsored a contest every two weeks, with no entry fee for club members. One contest would include Class A & C speed and stunt; the next would have Class B & D speed and scale. Also included was a "novice" event, whose only requirement was that the entrant must not have competed in any previous contest. Tested lines were provided to eliminate the usual tangle of wires. Prizes were merchandise coupons good for $2, $3 or $5. Newcomers to modeling were further encouraged by the fact that the "experts" were often at a big contest in some other city. Thanks to Norman F. Robinson, club correspondent, for sending us the above info.

Massachusetts

Slow but steady progress is being made by *Christian Hill Model Airplane Club* of Lowell, Mass. "Our interests are now completely in controline, although anyone may join," writes Pres. Allan J. Garmon of 575 Beacon St., Lowell.

Nevada

The 3rd annual All Western States contest, held in Las Vegas Oct. 16-17, was a great success. Sponsor was the Fred S. Pennington Post of the Veterans of Foreign Wars, in conjunction with the *Nevada Aveities*. After the meet the fliers and their families were treated to a real Western Barbecue *free of charge*. Results: *Expert Class A Speed Open*—Bob O'Brien 92.87; *Class B*—Wayne Leasure 111.11; *C*—Bob Lauderdale 128.57; *C Sr.*—Bob Behrens 128.57; *D*—Don Newberger 152.54; *Expert Stunt Open*—Bill Lake; *Sr.*—Don Gullota. *Novice Class A Speed Open*—Ray Campbell 77.59; *Sr.*—Bob Richards 63.82; *B Open*—Charles Schuette 107.75; *Sr.*—Bob Richards 98.90; *Jr.*—John Brodbeck 101.69; *C Open*—A. W. Wright 119.20; *Jr.*—Mike Thompson 103.44; *D Open*—A. W. Wright 138.46; *Sr.*—Bob Behrens 137.40; *Jr.*—Mike Thompson 110.42; *Novice Stunt Open*—Carlton Kibler; *Sr.* — Lewis Simpson; *Women's Event*—Beverly Sappington; *Team Stunt*—Don Gullota and Ed Abacherle; *Scale Open & Sr. Comb.*—Arthur Giddins; *Jr.*—Vaughn Brewer.

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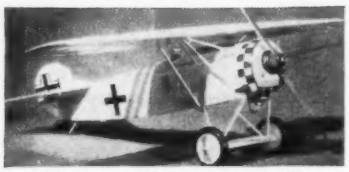

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New York

Clinton A. Schumaling, president of a a new club just formed in Port Chester, wrote us the following (but failed to state the name of the club): Vice Pres.—Alsace L. Rietze; Treas. & Sec.—Dennis Light; Chief of Staff—Charles Boyce; Flight Commander—"Johnny" Gianfrancisco. Every member receives a brand-new *Pinto* and U-control upon entering, and after three months is given his AMA license to fly. Total membership at this writing is 8. Meetings are held every Sunday. They are fortunate to have two fields at their disposal: Lyons Park on Putnam Ave. and R. B. W. Field, Midland Ave., the latter being their home field. The main objective of the club is to study aerodynamics.

Ohio

Congratulations and best wishes to the new *"RCA Prop Wash,"* a newsy and instructive publication of the Akron *Rubber City Aeronauts.*

Oklahoma

James Williams tells us that the *Oklahoma City Glo Bugs* held a speed contest on Nov. 16. The weather was grand and sportsmanship was tops. Results: *Class A*—Gene Bonenberger; *B*—Dan Marek; *C*—Paul Bunch; *D*—James Williams.

Pennsylvania

Following is an excerpt from a letter recently received from James G. Schenck (614 Ridgefield Ave., Pittsburgh 16) of the *Pittsburgh Conference on Model Aeronautics:*

"Last August, the president of the Harmon Creek Coal Corp., James F. Hillman, turned over several hundred acres of land to the Model Wings Club for contest purposes. The field is located 22 miles west of Pittsburgh on Route 22. Since this field is centrally located from the following cities, I would like the contest directors of each to consider seriously using this field for contest work in the 1949 season: Steubenville, O.; East Liverpool, O.; Wheeling, W. Va.; Pittsburgh, Pa.; Aliquippa, Pa.; and Washington, Pa. If I receive favorable response from these leaders by mail I'll have some concrete material for obtaining an excellent model airport with all the needed facilities such as a club house to keep contest supplies, a public address system and a hard surfaced runway. Those facilities will be at the disposal of any club who desires to put on a meet at Hillman's Model Wings Field. But I *must* have their letters for proof that the modelers want and need such a field."

Now the fellows who have been complaining about having no place to fly their beautiful models had better get busy and write Jim Schenck at the above address. The sooner you reply the sooner you'll have a field!

The *Model Wings Club* and the Beacon Electronics Co. cosponsored a radio meet October 24 at Hillman's Model Wings Field, near Burgettstown, where 11 radio controlled models were brought out to the field. Walt and Bill Good came to do some demonstrational flying. Chet Lanzo won top honors.

Canada

On Nov. 4 at Ladysmith, B.C., the *Nanaimo Glo-Devils* and the *Twin City Flyers* of Port Alberni, B.C. co-sponsored a controline meet. Leo Katila won top honors.

PHOTO CREDITS

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1		Chance Vought Aircraft
6	Above	Modelpic
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21	Top & Bottom	Northrop Aircraft
	Upper Center	Wide World
	Lower Center	Acme
34	Top Three	Elmer Gatti

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1/16x1/4	2c	1/4x5/8	7c	1/16x2	8c
1/16x3/8	2½c	1/4x3/4	8c	3/32x2	10c
1/16x1/2	3c	5/16 sq.	5c	1/8x2	10c
3/32 sq. 3 for	4c	3/8 sq.	6c	5/32x2	12c
3/32x3/16	2c	3/8x1/2	8c	3/16x2	14c
3/32x1/4	2½c	1/2 sq.	9c	1/4x2	16c
3/32x3/8	3c	3/4 sq.	15c	5/16x2	18c
3/32x1/2	3½c	PLANKS		3/8x2	20c
1/8 sq. 3 for	5c	1x3	$ .50	1/2x2	22c
1/8x1/4	2½c	1x6	.90	1/32x3	10c
1/8x3/8	3½c	2x2	.60	1/16x3	12c
1/8x1/2	4c	2x4	1.20	3/32x3	15c
5/32 sq.	1½c	2x6	1.80	1/8x3	19c
3/16 sq.	2c	3x3	1.50	3/16x3	22c
3/16x1/4	3c	3x6	2.70	1/4x3	25c
3/16x3/8	4c	4x4	2.50	3/8x3	30c
3/16x1/2	5c	4x6	3.70	1/2x3	35c

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3/32x3/8	3c	5/32x5/8	5c	7/32x3/8	7c
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Propeller Blocks

8x7/8x1-3/16..	6c	1-3/4	10c	18x1-3/4x2	32c
10x1x1-1/2	10c	Glider Wing Section 16x1-1/2x2	26c	9x1-1/2x2	15c
12x1x1-1/2	12c			10x2x2-1/4	25c
14x1-3/16x				3x3/16x20	18c

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Engine Control with U-Reely

(*Continued from page* 29)

shaft. Drill a 1/4" hole through the center of the blank and accurately centered in relation to the 3/16" hole. Mark the center of the disk in the lathe while rotating; then center the 1/4" hole over the mark when cementing the blank to the disk. If the 1/4" hole is off-center relative to the 3/16" hole, center the 3/16" hole over the mark. The 1/4" hole is later turned out to 1/2" to snugly fit the *U-Reely* shaft. The pin is held in the shaft by a 10-32 set screw, the same as the one which holds the *U-Reely* crank in the other shaft end.

A simple way to guide the thread to the drum and prevent it from "jumping the track" is to shape a wire as in drawing 1 and secure it in position with one of the *U-Reely* housing screws. Drill a 1/16" socket about 1/8" deep in the housing to receive the terminal end of the wire for positioning it properly, the wire being so bent as to seat firmly in the socket. Ordinary stiff iron wire about .045" dia. is formed with a four or five turn coil to form the thread guide. This coil has about 1/8" inside dia. and is centered over the thread groove at about the position shown.

The thread is secured to the thread drum by passing it through a small hole in the bottom of the groove and knotting it. The other end has a double eye fitting that will pass through the guide coil and can be connected to a .010" or .016" wire at the plane extending from the control lever through a wing guide and terminating in a "safety pin" hook to connect with the double eye fitting. Saw a slot in the outer flange of the thread drum to pass the end of the thread through when you don't want to use the engine control. This end can then be wrapped around the hub and secured with a rubberband so that the thread merely rotates with the drum instead of reeling and unreeling. Of course, the drum can be removed if desired although that is not as convenient.

It is necessary to "adjust" the size of the thread drum to accommodate both the particular engine control thread you use and the particular engine control lever and return spring on your plane. Assume for instance that your lever and spring combination requires a 4 oz. pull to move the lever away from its stop. In that case the thread drum must reel in the engine control thread at such a rate that the pull will remain less than 4 oz. at all times.

Attach a 2 ft. length of parcel post cord to the ends of the flying wires as in drawing 3 and have the cord looped around a horizontal broomstick solidly mounted as in a vise. Unreel all the flying wires about two turns, attach your engine control thread to the thread drum, wind it around the drum about three turns at the attached end, extend the other end over the broomstick and attach a 4 oz. weight to it.

Now with the flying wires taut (about 5 lbs. pull) measure the distance between the weight and the broomstick. Reel the wires and the thread in maintaining about a 5 lb. pull on the wires. When you get to the broomstick see how many inches the weight has dropped. This is the key as to how much to increase the diameter of the thread drum for reeling the engine control thread at the proper rate; the diameter works out to about 3" or 4" for most threads. In this way compensation is had for the resiliency of the thread whereas the flying wires do not stretch an appreciable amount. If it is necessary to increase the diameter of the thread drum, the simplest method is to use a strip of gummed paper the width of the thread drum groove.

To minimize the effect of moisture such as dew in the grass on the engine control thread, use one made of Nylon. These usually have minimum stretch which also eliminates those troubles experienced due to resiliency of the thread. It is advisable to provide a plastic or sheet metal housing over the thread drum to protect it from mechanical injury when in use or when carried loose in the plane carrying case or tool box.

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Indoor Stick Champ

(*Continued from page* 11)

and construction—weight loading, rigidity, and the propeller are the critical points. Generally speaking the following rules should apply:

Elevator area: 33-1/3 % of wing area.

Rudder area: 7% of wing area.

Overall length of motor stick, boom & tail: 75% of wingspan.

Mean aspect ratio of wing: 8 to 1.

Wing post height: 60% of wing chord at center rib.

Propeller diameter: 45% to 50% of wingspan.

Propeller pitch: 2 to 2.3 times diameter.

A schedule of weights for the component parts follows, with the minimum a theoretical figure yet to be attained, and the maximum figure one which cannot be exceeded if contest winning performance is to be had:

	Minimum	Maximum
150 sq. in. wing	.015 oz.	.020 oz.
50 sq. in. elevator & rudder	.004 oz.	.006 oz.
10" boom	.002 oz.	.004 oz.
15" motor stick complete	.013 oz.	.017 oz.
16" microfilm prop	.007 oz.	.011 oz.
Total weight of model	.041 oz.	.058 oz.

You will note that we show the weights in whole thousandths of ounces. Actually in practice the thousandths are split in halves and quarters, impossible as it may seem. This is accomplished by means of a simple balance, mounted on razor blades, which you can build in an hour. Or you can convert a standard scale (see article in July 1946 Model Airplane News). A good balance is an absolute necessity and should be used constantly during construction.

Motor sticks are almost invariably tubes of teardrop crossection. Tail booms are either round or teardrop and may be made of considerably thinner wood since they do not have to support the strain of a tightly wound motor. Construction methods are simple. Carve and sand a former from hard balsa, white pine, or any other wood that is easy to work. Sand the balsa to proper thickness, cut the blank to proper dimensions, wet it in a pan of hot water and bend it around the former, wrapping it with 1/2" strips of wax paper or ribbon. Turn the oven of the kitchen stove on low (250° for 10 minutes) and place the stick in the oven to bake out the moisture. Remove the formed motor stick blank from the former carefully and glue the seam. It must be glued for the entire length or the stick will collapse the first time a strain is placed on it—but thin glue used as sparingly as possible to do the job should be used. Motor sticks are capped at each end with 1/32" sheet balsa or two 1/64" crossgrained laminations. The rear hook and the thrust bearing are then glued securely. Tail booms are made just like the motor sticks.

The wing mounts (or sockets) are made of tissue, wrapped around 1/16" drill rod or a nail, and doped as they are wrapped. This forms a sturdy paper tube which may be cut in ,1/4" lengths. The wing posts should be sanded round and fitted into the mounts before they are cut to length to insure the tightest possible fit. It is embarrassing to lose a wing just when you are cooking with T-56 at 18 minutes and the model is still a hundred feet off the floor.

Wings are easy. Sand and cut the stock for spars to proper dimensions.

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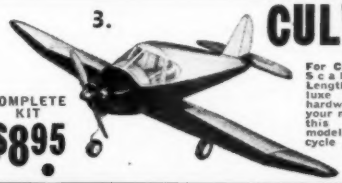

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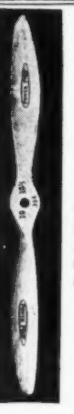

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With a full size layout of the wing thumbtacked to your drawing board, tack the spars around the outline with a minimum of glue. Sand a small sheet for rib stock to the proper thickness. Cut out the ribs with a metal template (cardboard templates will do in a pinch if you are careful with the razor). We usually build and cover the entire wing in one piece, although pulling a 36" sheet of microfilm off the water sometimes has problems.

Wet the wingtip stock in hot water, pin it around a cardboard or balsa pattern and bake it out. When it is dry remove from the pattern and butt, or bevel splice it to the wing spars.

Cut the ribs to length and glue in place. Let the wing dry for several hours on the board so that contraction of the glue will not warp the joints. Use a razor blade to cut the wing spars loose where they have been tacked to the plan. Cover the wing with film and you're practically done.

For the uninitiated, let's digress a moment on covering. There's nothing mysterious about microfilm. Brief descriptions of techniques and formulae are often more confusing than one good full length article, but we'll try. You'll need a water surface on which to pour the film. The bathtub will do, but a wood frame of 1/4" x 1" strips about 2' x 3' in size, covered with oilcloth or other waterproof fabric is better. The microfilm frame may be either wire or wood. We use a frame about 1' x 3' in size made of 1/4" square balsa, but it is better to start with the smaller size frames and work up to big ones.

If you can secure a good dependable solution from your hobby shop it is preferable. There are several available—some are good, others aren't. But if you can't buy the solution ready for use, a mixture of pure nitrate dope and castor oil mixed five drops of casto to each ounce of dope will provide a satisfactory mixture. You may find it necessary to vary the amount of oil.

To make a sheet of film, fill a teaspoon from the bottle—then, holding the spoon about an inch above the surface of the water, start to pour and as you do so sweep your arm along the surface of the water for about two feet. This motion will produce a rectangular film of uniform thickness. When the edges of the film start to wrinkle indicating that the film has started to dry, set the hoop down over the film being sure that it does not extend beyond the edges. Then work the edges of the film up over the frame around the entire perimeter. The frame, with the film attached, may then be removed from the water with a sliding, lifting motion, working from one side of the frame to the other.

Hang the frame of film up to dry. Although it can be used within a few hours it is preferable to let the film age in a dust-free room for several days.

Covering is much simpler than it looks. Set the hoop on supports so that the film cannot come in contact with any surface. Using a small camel's hair brush, coat the spars and tips of the surface to be covered with water or saliva. Drop the wet frame on the film. Push the spars down to the film and they should adhere. Where the film has not stuck to the frame, simply wet it again with the brush until you are certain the film is stuck to the frame all of the way around. Trimming can be done with a hot wire or a splinter of balsa dipped in thinner. If you use the wire method, keep a candle burning nearby in which to heat the wire while trimming.

Make small cuts through the edge of the spar with a pointed razor blade where the dihedral breaks are to come. The spars can then be easily cracked to form the angle and firmly glued. The proper angle can be maintained until the glue has set by blocking up the tip.

Wing posts are installed next. They should be offset 3/8" from the center, so one wing half is a bit longer than the other to counteract torque. Install the bipod on the wind, leaving the notch at the apex on which to catch the wire.

Because of the scarcity and difficulty in securing tungsten wire for bracing we have been using #46 Nichrome. Human hair, nylon thread and silk have also been used as substitutes, but wire is best. Cut two pieces of wire to length. Glue one end of one piece to the trailing edge at point A, pass it over point X at the bipod and glue it at point B. Pull the wire tight at point B but do not bow the wing any more than necessary to keep it tight. Glue the other wire at point C, over point X, and down to D. Pull the leading edge wire just tight enough to line the front spar up with the rear spar.

The flying wires may now be installed. They should be glued at both ends of the leading and trailing edge. They can then easily be drawn to the proper tension by pulling the wire down in the center and gluing to the wing post. Check the wing alignment constantly and carefully when drawing up the wires to avoid warping. Once the wires are installed further adjustments in wash-in and wash-out can be made by twisting the wing so the top wires slide through the notch in the apex. When a satisfactory adjustment has been attained they can be spotted in place with a light touch of glue. If flight tests should prove the adjustment unsatisfactory they

can be loosened at this point with a little thinner, and when the adjustment is satisfactory they can be permanently glued.

Tails are conventional and need no particular explanation. If you've built one too flimsy brace it with wire, balsa, or both. If it's too heavy, consign it to the ashcan and build another. You may want to install a trimming adjustment, consisting of a short length of 1/32" aluminum wire glued between the boom and elevator; or leave it out. It helps in making quick, positive adjustments but it adds weight and is not as sturdy as a one-piece boom. If you are inclined to get excited at contests or have not had sufficient time to test and adjust the model, the adjustment wire will help to make changes more quickly since it can be bent more effectively than the one-piece boom can be warped.

The propeller is not difficult to build. Construct the jig as shown and tack the spars to the jig lightly with glue. Draw a full size outline of the blade and mark off the rib positions so the ribs may be cut to length. Cut the ribs and glue them on the spars. Then glue the outline to the ends of the ribs. Remove the prop from the jig, glue in the hub support and prop shaft and you're ready to cover. Lack of support for the front spar at the hub permits it to flex under strain of high torque, giving good butterfly action and slowing down the prop under the early burst of power. It amounts to built-in automatic pitch control.

Every indoor builder is guilty of parlor flying at 3 a.m. You might as well take a crack at it. Use only about a 14" loop of 3/32" rubber so you won't have to fuss with slack. Handwind about a half row of knots, stand in one corner of the room and launch the model. On this power it should climb steadily. You can make all the preliminary adjustments until you hang it on the lamp in the corner and have to start repairs, or to build a new model. Then, when you've caught up on a little sleep, take the model to the largest hall, church, theater or available draft-free building and prepare for real fun. If the building has a ceiling of less than 40' use a loop of rubber in excess of 20". Start with a thousand turns and work up from there. When you've reached this stage you're on your own. You'll learn by experience about prop RPM, maximum turns in a motor, correct adjustment, and all the other little angles that help. A bookful of hints aren't worth one full day's flying. So go to it, build 'em and bust 'em, and build some more! Somebody is going to boost the Class C record to the mythical 30 minutes and you might as well have a shot at it.

Glow Plug Throttles

(*Continued from page 25*)

adapted to a *Bantam* engine. It consists of a piece of brass tubing which fits snugly over the intake tube and whose end is plugged to resemble an open can. Slide the can over the intake tube and with a hacksaw cut a slot as shown in Fig. 3. Rotating the "can" will close the slot, and the engine RPM will be reduced.

On engines with a straight intake tube, a spring oil cap may be forced either inside or over the intake tube, and an adjustment as that in Fig. 2 may be used.

The above throttles have all been tried and used successfully by the author. Be sure to include a glow plug engine in your next free flight model and adapt one of these glow plug throttles. Good luck and keep 'em flyin'!

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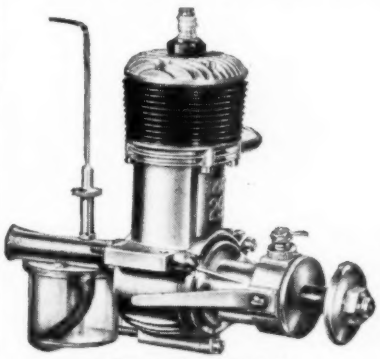

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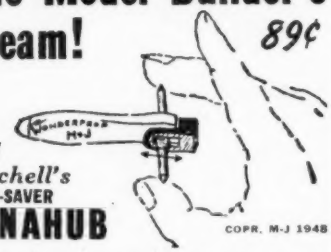

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Design Forum

(*Continued from page* 12)

is less tendency to skid. This is the reason for the excellent performance of many pylon models which have the CLA well above the CG.

Some may ask why the plane does not nose to the right out of the skid when the side pressure acts to the rear of the CG even though it is above it. If the side pressure *actually acts rearward of the CG* the plane will nose out of the skid provided no other rotating forces are introduced. However when the airplane *skids*, due to sudden turn and bank, the resultant side pressure RSP acting above the CG banks the plane steeply, Fig. 2A. At this steep angle of bank the side pressure SP on the *fuselage* and *structure* becomes smaller because its side projected area becomes smaller. On the other hand the side pressure WSP on the wing becomes greater. Pressure WSP is well forward, nearer the nose of the airplane than pressure SP. Consequently *the resultant side pressure RSP moves forward* closer to the CG, but above it.

Apparently the structural side pressure SP moves forward also because the propeller and nose create greater sidewise resistance compared to the fin and rear part of the fuselage *when the airflow strikes it from the side* at relatively small angles. The resultant side pressure therefore moves well forward and acts at a point directly above the CG or even ahead of it, Fig. 2B. This inward force coupled with the outward pull of the centrifugal force CF not only rolls the plane into a steep bank as in Fig. 2A but also noses the plane into a tighter turn, arrows T Fig. 2B, especially if the rudder R is set unintentionally for a left turn.

It is conceivable also that the inner lower wing acts at a negative attack angle due to the airflow approaching it from the outer side of the turn, while the outer wing acts at only a slightly increased angle, for instance at 4°. If the attack angle of the inner wing is at zero lift, the angle is approximately—3°. The *drag* at —3° on wings commonly used on models is usually greater than at +4°. This creates greater drag on the low inner wing than on the high outer one, which swings the plane into a sharper turn, indicated by arrows T, Figs. 1 and 2. In turn this increases the force reactions which produce banking, circling and diving. Actual practice indicates that these or similar reactions take place to cause spiral instability in models with a high CLA.

To further illustrate the problem, look at Fig. 2A which illustrates one of the possible force arrangements when an airplane starts to skid. L is the lift on the wing which has moved outward due to the skid. WSP is the side pressure on the wing. Arrow W acting at point CG is the pull of gravity downward. Arrow CF is centrifugal force pulling outward. Arrow SP is the air side pressure acting on the fuselage, tail and other parts of the structure *not including the wing*. Arrow RSP is the *resultant* side pressure and is a combination of the side pressures indicated by arrows WSP and SP.

Now consider the action of these forces. Lift L and weight W balance one another. Side pressure RSP, however, acts above and in opposite direction to centrifugal force CS. This causes a rotation to the right when looking at the figure and tends to increase the angle of bank. This not only prevents recovery but actually increases displacement.

Now look at Fig. 3. The CG has been raised. The wing dihedral is less, which causes lift L to act closer to the wing center when skidding. In this figure lift L and pull of gravity W balance one another. The resultant side pressure RSP acts below the centrifugal force CF because the fuselage side area has been dropped well below the CG. The position of side force RSP relative to arrow CF now causes a counter clockwise couple that tends to right the airplane instead of increasing the bank. This stable condition, while skidding, has been achieved by *reducing the dihedral angle* on the wing and arranging the structure of the airplane so that *the side pressure acts below the CG* instead of above it.

In Fig. 4 the side pressure is shown on a line with the centrifugal force so that all forces are in balance. Under these conditions the airplane will remain in this attitude without rotation one way or the other, provided lift L equals pull of gravity W and centrifugal force equals the side pressure. If for any reason this airplane slows down in flight so the centrifugal force CF is reduced, the resultant of the centrifugal force and weight W will change from direction R to K. The resultant K now lies to the right of the vertical axis V-V¹, which fact creates a sideslip in direction D, instead of a skid. This causes the lift to move from its original position L to a point on the lower wing L_1. This in combination with the force of gravity W creates a righting couple.

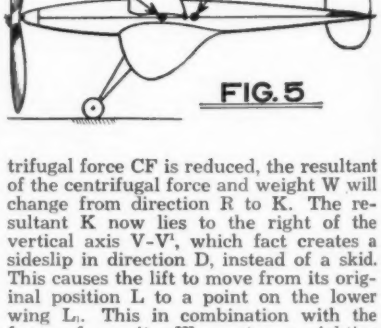

FIG. 5

A number of model fans have said that if the CLA is low so that forces are balanced during a skid, that the low lateral area will create a side pressure during a sideslip which eliminates any righting effect. Fig. 4 indicates that this is not true. The critical point here is that *lift L moves out on the lower wing* creating a *righting couple with the pull of gravity W*. This couple is not affected or opposed by the side pressure which acts at the CG and which therefore creates no rotation in itself.

Many advocates of pylon type models claim that the high CLA not only creates no disturbing effect but actually produces a righting effect. They deny the fact *that an airplane skids under certain conditions* because, when skidding, this *high CLA creates the unstable condition described above*. Many ignore this fact and claim that airplanes only sideslip and therefore the high CLA increases stability. If this assumption is true the high CLA is certainly an advantage. However, skidding does take place under certain conditions and an airplane built to right itself only during a sideslip will get into difficulty when skidding. So we see that the problem involves one more step than is commonly assumed. The plane must not only be designed to be stable during a sideslip but *also during a skid*. This idealistic condition can be achieved by keeping the

CLA on a line with the CG or below it, when the thrust line of the model is horizontal. In this way disturbing force couples produced during a skid are reduced or eliminated without preventing righting couple from operating during a sideslip.

One of the reasons why many modelers find it difficult to understand this theoretical analysis is the extremely complicated force setup and reactions. Consequently the final test whether or not this foregoing analysis is correct lies in *practical application and demonstration.* Its value and accuracy were dramatically proved by Roy Chesterton of the English Wakefield team at the 1948 International contest in Akron. Chesterton evidently took this CLA theory more seriously than the American competitors, in spite of the fact that the theory was worked out in practical form and presented by an American. *His plane won the Wakefield Contest!* Onlookers attributed the unusual performance of his airplane to its steady, undisturbed, straight climb. Instead of using a pylon and locating the wing high above the fuselage, Chesterton placed his wing on the fuselage and constructed a streamlined fin beneath the fuselage and wing. This extended down a considerable distance so that the CLA was on a line with the CG or below it.

An approximate side elevation of Chesterton's plane is shown in Fig. 5. Usually the use of a low CLA has been confined to gas models, but here it was demonstrated clearly that it also has great value in increasing the performance of rubber powered models. Greater performance in this case is *not obtained by an increase in lift or a reduction in drag* but from *an increase in the steadiness of flight* and by the prevention of unstable or irregular maneuvers that cause *a loss of altitude and waste of power in recovery.*

If you ever carefully watched the flights of contest airplanes you will realize that much more altitude and power are lost from spirals, stalls, banks and similar antics than from a lack of aerodynamic efficiency. *The loss in efficiency is small compared to the power that may be lost or wasted in recovery from unstable maneuvers or failure to climb steadily.*

* *

Jerome L. Rivers asks an interesting question: "What is the best possible wing curve for a very low aspect ratio wing?" *Low aspect ratio* means that the wing chord or width is large compared to its span. In such cases a comparatively thin or low cambered wing section is advisable for two reasons. First, low aspect ratio wings fly most efficiently at *small angles of attack.* They are therefore most adaptable to high speed flight, because at large attack angles there is considerable spill of air past the wingtips, which decreases their lift and increases drag. It is inadvisable therefore to use them at high attack angles. At low attack angles there is only slight wingtip "spill".

Second, *low camber* is most effective at high speed and therefore most suitable for low aspect ratio wings, because the drag at small attack angles is much lower than with high cambered wings of equal lift. For aspect ratios of 4 or less the wing camber or height of the wing curve should be *not more* than 1/12 the wing chord. Cambers as low as 1/16 are often used. These are most effective on very high speed airplanes because the lift drag ratio is usually very high.

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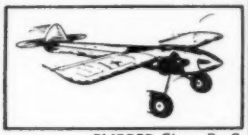

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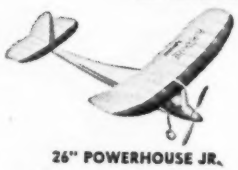

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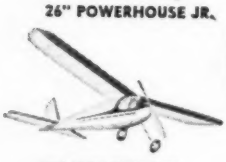

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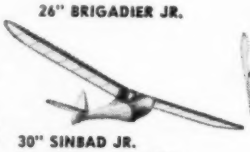

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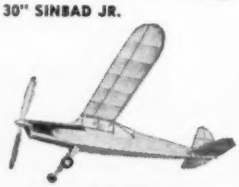

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Flash

(*Continued from page* 5)

the Northrop YB-49 and a comparison of performance should prove interesting. Handley-Page is also readying a jet bomber, this time a four jet model featuring a swept back wing.

YOU WILL RECALL THAT the first Grumman XF9F *Panther* fighter was powered by an imported Rolls-Royce *Nene* turbojet engine. The No. 3 airplane has now been test flown with our own Allison J-33 turbojet engine and performance of the plane and engine pronounced satisfactory The production *Panther*, of which 317 are scheduled for completion, will be powered by both engines half-and-half. The *Nene* is being built in this country under license by Pratt & Whitney. Many observers believe that this Navy engine award to P&W was merely to give that company needed experience in the production of jet engines in preparation for all-out output for a new Pratt & Whitney jet engine, which has not yet been announced. Prior to the *Nene* award, P&W produced a quantity of Westinghouse 19B turbojet engines for the McDonnell FH-1 *Phantom* fighter, production on which has been completed.

AIR FORCE has added another odd plane to its stable: the Chase YC-122 assault transport, which completed its first test flight successfully at Trenton, N.J. The new plane is actually a Chase CG-18A assault glider with two Pratt & Whitney R-2000 engines installed. The craft has a gross weight of 30,000 lb. and a service ceiling of 23,000 ft. It has a span of 86 ft. 3 in., is 53 ft. 4 in. long and stands 19 ft. 8 in. high on its tricycle landing gear. Three have been ordered for experimental test. The design was competitive with the Northrop *Pioneer* but this tri-motor aircraft, as the C-125 *Raider*, has been selected for production and contracts for 53 in various models.

RYAN AERONAUTICAL CORP. is at work on a pilotless aircraft for the Air Force known as the *Firebird*. Although details are classified, the missile is said to be subsonic and powered by turbojet engines.

The new missile is not to be confused with the AQ-2 missile now in production for both the AF and the Navy. Ryan has switched its production line from commercial *Navion* four place planes to the new L-17A military liaison version. However, there are enough *Navions* in the "pipeline" to satisfy customers until completion of the military order.

NORTH AMERICAN AVIATION is fashioning special wing skins for its sonic-speed F-86 jet fighter. These skin sheets are tapered in thickness from a thick dimension at the root to a thin dimension at the tip in order to carry the wing load more efficiently. Present constant thickness skin is too thick in the tip region and thus is merely excess weight. North American uses a special milling machine to taper the sheets to the desired thicknesses. Aluminum Co. of America, which supplies only constant thickness sheet, is now developing special equipment to provide tapered skin sheets on a production basis.

Faultless Chick

(*Continued from page* 17)

Ever see a ship climb just about O.O.S. before the motor had run its full 20 seconds? No? Well watch the *Faultless Chick*. Watch real close—better use binoculars. Or, is a straight climb at 15° to 30°, either at 10 or 30 mph more what the doctor ordered? The *Faultless Chick* will do it, after turning trib tab screw a few times and changing wing incidence. Like Phoebe Nebb's husband Willie, this ship can do *anything*—except climb to the right.

SPECIFICATIONS

Span.....47"
Total effective wing area...475 sq. in.
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Wing loading .....3.8 oz./100 sq. in.
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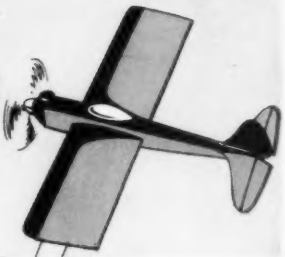

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